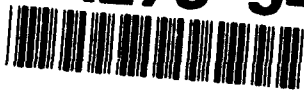


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NBS CIRCULAR 561



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for Thermocouples

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## SUPPLEMENTAL NOTICE

When these tables were prepared, the thermocouple-material combinations that were included represented the most commonly used thermocouples in the United States. Other thermocouple combinations were excluded, not on the basis of reliability, but because their limited use did not justify extensive studies of little-used materials. On the other hand, the inclusion of the trademarked materials Chromel and Alumel did not represent a special endorsement of these products, but only recognized them as forming a thermocouple combination that had gained almost exclusive usage under conditions for which no other really competing thermocouple materials were available.

The situation with respect to Chromel and Alumel has since changed, however, as competing materials are now being widely marketed. In view of this fact, the National Bureau of Standards wishes to make clear that it does not approve or otherwise endorse the Chromel-Alumel thermocouple to the exclusion of competing products which may or may not be of equal quality. The Bureau has made no study of the relative merits of these thermocouples.

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## Reference Tables for Thermocouples

Henry Shenker, John I. Lauritzen, Jr., Robert J. Corruccini  
and S. T. Lonberger



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### National Bureau of Standards Circular 561

Issued April 27, 1955

[Supersedes Circular 508]

## Preface

One of the important functions of the National Bureau of Standards is to compile scientific and technical data that have broad and useful applications in science and industry. In many cases the programs are carried out in cooperation with scientific and industrial bodies requiring basic and accurate information in a given field. A project of this type that has been in progress at the National Bureau of Standards for several years has involved the preparation and issuance of up-to-date temperature-electromotive-force tables for thermocouples used in science and industry to convert the measured electromotive force of thermocouples into equivalent temperatures, the testing and calibration of commercial thermocouples, the preparation of purchase specifications for thermocouple wire, and in the precise calibration of the scales of instruments in order that temperatures may be read directly.

The present reference tables have been prepared to make available in composite and convenient form the data previously issued in Bureau publications now out of print, and to meet the indicated continuing need in industry and science for the currently accepted values.

A. V. ASTIN, *Director.*

## Contents

	Page
Preface .....	III
Introduction .....	1
<b>Part I. Celsius (centigrade) Tables</b>	
1. Platinum versus platinum-10-percent-rhodium thermocouples. Millivolts versus degrees Celsius .....	3
2. Platinum versus platinum-10-percent-rhodium thermocouples. Degrees Celsius versus millivolts .....	8
3. Platinum versus platinum-13-percent-rhodium thermocouples. Millivolts versus degrees Celsius .....	13
4. Platinum versus platinum-13-percent-rhodium thermocouples. Degrees Celsius versus millivolts .....	18
5. Chromel-alumel thermocouples. Millivolts versus degrees Celsius ..	23
6. Chromel-alumel thermocouples. Degrees Celsius versus millivolts ..	25
7. Iron-constantan thermocouples (modified 1913). Millivolts versus degrees Celsius .....	29
8. Iron-constantan thermocouples (modified 1913). Degrees Celsius versus millivolts .....	31
9. Copper-constantan thermocouples. Millivolts versus degrees Celsius .....	34
10. Copper-constantan thermocouples. Degrees Celsius versus millivolts .....	35
11. Chromel-constantan thermocouples. Degrees Celsius versus millivolts .....	37
<b>Part II. Fahrenheit Tables</b>	
12. Platinum versus platinum-10-percent-rhodium thermocouples. Millivolts versus degrees Fahrenheit .....	38
13. Platinum versus platinum-10-percent-rhodium thermocouples. Degrees Fahrenheit versus millivolts .....	43
14. Platinum versus platinum-13-percent-rhodium thermocouples. Millivolts versus degrees Fahrenheit .....	51
15. Platinum versus platinum-13-percent-rhodium thermocouples. Degrees Fahrenheit versus millivolts .....	56
16. Chromel-alumel thermocouples. Millivolts versus degrees Fahrenheit .....	64
17. Chromel-alumel thermocouples. Degrees Fahrenheit versus millivolts .....	66
18. Iron-constantan thermocouples (modified 1913). Millivolts versus degrees Fahrenheit .....	73
19. Iron-constantan thermocouples (modified 1913). Degrees Fahrenheit versus millivolts .....	75
20. Copper-constantan thermocouples. Millivolts versus degrees Fahrenheit .....	80
21. Copper-constantan thermocouples. Degrees Fahrenheit versus millivolts .....	81
22. Chromel-constantan thermocouples. Degrees Fahrenheit versus millivolts .....	84

# Reference Tables for Thermocouples

Henry Shenker,<sup>1</sup> John I. Lauritzen, Jr.,<sup>2</sup> Robert J. Corruccini,  
and S. T. Lonberger<sup>3</sup>

Expanded reference tables for platinum versus platinum-10-percent rhodium, platinum versus platinum-13-percent-rhodium, chromel-alumel, iron-constantan (modified 1913), copper-constantan, and chromel-constantan thermocouples are given with temperature in degrees Celsius (centigrade) and Fahrenheit and electromotive force in millivolts as the arguments. The tables are based upon the absolute electrical units and the International Temperature Scale of 1948.

## Introduction

The temperature-electromotive-force relationship for a thermocouple in general cannot be expressed by a simple equation. It is convenient, therefore, to have empirical tables giving the temperature-electromotive-force relationship for the various types of commercially available thermocouples. For any thermocouple type, a table is based on calibrations of representative thermocouples at sufficient points to yield a temperature-electromotive-force plot characteristic of the material. These tables, therefore, do not represent the temperature-electromotive-force relationship for a particular thermocouple but rather a mean of a number of thermocouples of that type. The reference tables so derived provide a basis for drawing deviation curves for comparing individual thermocouples with others of their type or with instruments calibrated to read temperature directly. By using the reference tables in conjunction with a deviation curve, greater precision may be obtained by using a given number of calibration points than from the use of the calibration data alone. The deviation curve is constructed by plotting the differences between the calibration data of an individual instrument and the reference table. The points so plotted may then be connected by a continuous curve which may be used for interpolating between calibration points. For example, it is desired to determine the temperature of a furnace from the measured electromotive force of a calibrated thermocouple. The electromotive force developed by the thermocouple, however, does not correspond to that of any of the calibration points. By plotting a difference curve from the calibration data, one may interpolate between the calibration points to find the correction to be added algebraically to the measured electromotive force to yield the reference table value. The reference table may now be referred to and the furnace temperature corresponding to the corrected thermocouple electromotive force determined.

Reference tables for the different types of commercial thermocouples have been published at various times by the National Bureau of Standards. The present publication brings together the latest versions of all such tables prepared at the NBS. The numerical values given in these tables are the same as those given in "Reference tables for thermocouples", by Henry Shenker, John I. Lauritzen, Jr., and Robert J. Corruccini, NBS Circular 508 (1951) and "Modified 1913 reference tables for iron-constantan thermocouples", by Robert J. Corruccini, and Henry Shenker, J. Research NBS 50, 229 (1953) RP2415.

In these tables electromotive force is expressed in absolute units. The change from international to absolute electrical units, which, by international agreement, became effective of January 1, 1948, is described in NBS Circular 459.<sup>4</sup> One absolute volt is equal to 0.99967 international volt (U. S.).

<sup>1</sup> Present address: Naval Research Laboratory, Washington, D. C.

<sup>2</sup> Present address: California Institute of Technology, Pasadena, Calif.

<sup>3</sup> This revision was prepared by S. T. Lonberger.

<sup>4</sup> NBS Circular 459, Announcement of changes in electrical photometric units, 7 pages (May 15, 1947), available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., price 5 cents.

Temperatures are expressed on the International Temperature Scale of 1948, which is defined in "The International Temperature Scale of 1948", by H. F. Stimson, J. Research NBS 42, 209 (1949) RP1962, and "Differences between the International Temperature Scales of 1948 and 1927", by R. J. Corruccini, J. Research NBS 43, 133 (1949) RP2014.

Certain small apparent inconsistencies will be found in the tables. Differences of this sort result from rounding and, being negligible, have been allowed to stand. For example, in table 1, the temperature 79.9° C (rounded) corresponds to exactly 0.500 millivolt, while from table 3, 0.500 millivolt (rounded) corresponds to exactly 80° C. By reverting to the equation in the original reference by which these values were calculated, one may confirm the correctness of the above values to the number of places given.

The tables for platinum versus platinum-10-percent-rhodium thermocouples are based on formulas in "Reference tables for platinum to platinum-rhodium thermocouples", by Wm. F. Roeser and H. T. Wensel, BS J. Research 10, 275 (1933) RP530. The tables for platinum versus platinum-13-percent rhodium thermocouples are based on tables from the same reference. The tables for chromel-alumel thermocouples are based on "Standard tables for chromel-alumel thermocouples", by Wm. F. Roeser, A. I. Dahl, and G. J. Gowens, J. Research NBS 14, 239 (1935) RP767. The tables for copper-constantan thermocouples are based on "Reference tables for iron-constantan and copper-constantan thermocouples", by Wm. F. Roeser and Andrew I. Dahl, J. Research NBS 20, 337 (1938) RP1080 for temperatures above 0° C (32° F), and on table 1 of "Calibration of thermocouples at low temperatures", by Russell B. Scott, J. Research NBS 25, 459 (1940) RP1339 for temperatures below 0° C. The tables for chromel-constantan thermocouples are based on tables for chromel-platinum given in RP767 and tables for constantan-platinum given in RP1080.

# Part I. Celsius (centigrade) Tables

**Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
0.000	0.0	1.8	3.6	5.4	7.2	9.0	10.7	12.5	14.3	16.0	17.7	0.000
.100	17.7	19.4	21.1	22.8	24.5	26.2	27.8	29.5	31.1	32.8	34.4	.100
.200	34.4	36.0	37.6	39.2	40.8	42.4	44.0	45.6	47.1	48.7	50.2	.200
.300	50.2	51.8	53.3	54.8	56.4	57.9	59.4	60.9	62.4	63.9	65.4	.300
.400	65.4	66.9	68.3	69.8	71.3	72.7	74.2	75.6	77.1	78.5	79.9	.400
.500	79.9	81.4	82.8	84.2	85.6	87.0	88.5	89.9	91.3	92.7	94.0	.500
.600	94.0	95.4	96.8	98.2	99.6	100.9	102.3	103.7	105.0	106.4	107.7	.600
.700	107.7	109.1	110.4	111.8	113.1	114.4	115.8	117.1	118.4	119.7	121.0	.700
.800	121.0	122.4	123.7	125.0	126.3	127.6	128.9	130.2	131.5	132.8	134.1	.800
.900	134.1	135.3	136.6	137.9	139.2	140.5	141.7	143.0	144.3	145.5	146.8	.900
1.000	146.8	148.1	149.3	150.6	151.8	153.1	154.3	155.6	156.8	158.1	159.3	1.000
1.100	159.3	160.6	161.8	163.0	164.3	165.5	166.7	167.9	169.2	170.4	171.6	1.100
1.200	171.6	172.8	174.1	175.3	176.5	177.7	178.9	180.1	181.3	182.5	183.7	1.200
1.300	183.7	184.9	186.1	187.3	188.5	189.7	190.9	192.1	193.3	194.5	195.7	1.300
1.400	195.7	196.9	198.1	199.2	200.4	201.6	202.8	204.0	205.2	206.3	207.5	1.400
1.500	207.5	208.7	209.9	211.0	212.2	213.4	214.5	215.7	216.9	218.0	219.2	1.500
1.600	219.2	220.4	221.5	222.7	223.8	225.0	226.2	227.3	228.5	229.6	230.8	1.600
1.700	230.8	232.0	233.1	234.3	235.4	236.6	237.7	238.9	240.0	241.1	242.3	1.700
1.800	242.3	243.4	244.6	245.7	246.9	248.0	249.1	250.3	251.4	252.5	253.7	1.800
1.900	253.7	254.8	255.9	257.1	258.2	259.3	260.4	261.5	262.7	263.8	264.9	1.900
2.000	264.9	266.1	267.2	268.3	269.4	270.5	271.7	272.8	273.9	275.0	276.1	2.000
2.100	276.1	277.2	278.4	279.5	280.6	281.7	282.8	283.9	285.0	286.1	287.2	2.100
2.200	287.2	288.3	289.4	290.5	291.6	292.7	293.8	294.9	296.0	297.1	298.2	2.200
2.300	298.2	299.3	300.4	301.5	302.6	303.7	304.8	305.9	307.0	308.1	309.2	2.300
2.400	309.2	310.3	311.4	312.5	313.5	314.6	315.7	316.8	317.9	319.0	320.1	2.400
2.500	320.1	321.2	322.2	323.3	324.4	325.5	326.6	327.6	328.7	329.8	330.9	2.500
2.600	330.9	331.9	333.0	334.1	335.2	336.3	337.3	338.4	339.5	340.6	341.6	2.600
2.700	341.6	342.7	343.8	344.8	345.9	347.0	348.1	349.1	350.2	351.3	352.3	2.700
2.800	352.3	353.4	354.5	355.5	356.6	357.7	358.7	359.8	360.8	361.9	363.0	2.800
2.900	363.0	364.0	365.1	366.2	367.2	368.3	369.3	370.4	371.5	372.5	373.6	2.900
3.000	373.6	374.6	375.7	376.7	377.8	378.9	379.9	381.0	382.0	383.1	384.1	3.000
3.100	384.1	385.2	386.2	387.3	388.3	389.4	390.4	391.5	392.5	393.6	394.6	3.100
3.200	394.6	395.7	396.7	397.8	398.8	399.9	400.9	402.0	403.0	404.1	405.1	3.200
3.300	405.1	406.2	407.2	408.3	409.3	410.4	411.4	412.4	413.5	414.5	415.6	3.300
3.400	415.6	416.6	417.7	418.7	419.8	420.8	421.8	422.9	423.9	425.0	426.0	3.400
3.500	426.0	427.0	428.1	429.1	430.2	431.2	432.2	433.3	434.3	435.3	436.4	3.500
3.600	436.4	437.4	438.5	439.5	440.5	441.6	442.6	443.6	444.7	445.7	446.7	3.600
3.700	446.7	447.8	448.8	449.8	450.9	451.9	452.9	453.9	455.0	456.0	457.0	3.700
3.800	457.0	458.1	459.1	460.1	461.1	462.2	463.2	464.2	465.3	466.3	467.3	3.800
3.900	467.3	468.3	469.4	470.4	471.4	472.4	473.5	474.5	475.5	476.5	477.5	3.900
4.000	477.5	478.6	479.6	480.6	481.6	482.6	483.7	484.7	485.7	486.7	487.7	4.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts



**Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1918). Reference Junctions at 0° C.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
4.000	477.5	478.6	479.6	480.6	481.6	482.6	483.7	484.7	485.7	486.7	487.7	4.000
4.100	487.7	488.8	489.8	490.8	491.8	492.8	493.8	494.9	495.9	496.9	497.9	4.100
4.200	497.9	498.9	499.9	501.0	502.0	503.0	504.0	505.0	506.0	507.0	508.0	4.200
4.300	508.0	509.0	510.1	511.1	512.1	513.1	514.1	515.1	516.1	517.1	518.1	4.300
4.400	518.1	519.1	520.1	521.2	522.2	523.2	524.2	525.2	526.2	527.2	528.2	4.400
4.500	528.2	529.2	530.2	531.2	532.2	533.2	534.2	535.2	536.2	537.2	538.2	4.500
4.600	538.2	539.2	540.2	541.2	542.2	543.2	544.2	545.2	546.2	547.2	548.2	4.600
4.700	548.2	549.2	550.2	551.2	552.2	553.2	554.2	555.2	556.2	557.2	558.2	4.700
4.800	558.2	559.2	560.2	561.1	562.1	563.1	564.1	565.1	566.1	567.1	568.1	4.800
4.900	568.1	569.1	570.1	571.1	572.1	573.0	574.0	575.0	576.0	577.0	578.0	4.900
5.000	578.0	579.0	580.0	581.0	581.9	582.9	583.9	584.9	585.9	586.9	587.8	5.000
5.100	587.8	588.8	589.8	590.8	591.8	592.8	593.7	594.7	595.7	596.7	597.7	5.100
5.200	597.7	598.6	599.6	600.6	601.6	602.6	603.5	604.5	605.5	606.5	607.5	5.200
5.300	607.5	608.4	609.4	610.4	611.4	612.4	613.3	614.3	615.3	616.3	617.2	5.300
5.400	617.2	618.2	619.2	620.2	621.1	622.1	623.1	624.0	625.0	626.0	627.0	5.400
5.500	627.0	627.9	628.9	629.8	630.8	631.8	632.8	633.7	634.7	635.7	636.6	5.500
5.600	636.6	637.6	638.6	639.6	640.5	641.5	642.5	643.4	644.4	645.4	646.3	5.600
5.700	646.3	647.3	648.3	649.2	650.2	651.2	652.1	653.1	654.1	655.0	656.0	5.700
5.800	656.0	656.9	657.9	658.9	659.8	660.8	661.8	662.7	663.7	664.7	665.6	5.800
5.900	665.6	666.6	667.5	668.5	669.5	670.4	671.4	672.3	673.3	674.2	675.2	5.900
6.000	675.2	676.2	677.1	678.1	679.0	680.0	681.0	681.9	682.9	683.8	684.8	6.000
6.100	684.8	685.7	686.7	687.6	688.6	689.6	690.5	691.5	692.4	693.4	694.3	6.100
6.200	694.3	695.3	696.2	697.2	698.1	699.1	700.0	701.0	701.9	702.9	703.8	6.200
6.300	703.8	704.8	705.7	706.7	707.6	708.6	709.5	710.5	711.4	712.4	713.3	6.300
6.400	713.3	714.2	715.2	716.1	717.1	718.0	719.0	719.9	720.9	721.8	722.8	6.400
6.500	722.8	723.7	724.6	725.6	726.5	727.5	728.4	729.3	730.3	731.2	732.2	6.500
6.600	732.2	733.1	734.1	735.0	735.9	736.9	737.8	738.8	739.7	740.6	741.6	6.600
6.700	741.6	742.5	743.4	744.4	745.3	746.2	747.2	748.1	749.1	750.0	750.9	6.700
6.800	750.9	751.9	752.8	753.7	754.7	755.6	756.5	757.5	758.4	759.3	760.3	6.800
6.900	760.3	761.2	762.1	763.1	764.0	764.9	765.9	766.8	767.7	768.6	769.6	6.900
7.000	769.6	770.5	771.4	772.4	773.3	774.2	775.1	776.1	777.0	777.9	778.9	7.000
7.100	778.9	779.8	780.7	781.6	782.6	783.5	784.4	785.3	786.3	787.2	788.1	7.100
7.200	788.1	789.0	790.0	790.9	791.8	792.7	793.6	794.6	795.5	796.4	797.3	7.200
7.300	797.3	798.3	799.2	800.1	801.0	801.9	802.9	803.8	804.7	805.6	806.5	7.300
7.400	806.5	807.5	808.4	809.3	810.2	811.1	812.0	813.0	813.9	814.8	815.7	7.400
7.500	815.7	816.6	817.5	818.5	819.4	820.3	821.2	822.1	823.0	823.9	824.9	7.500
7.600	824.9	825.8	826.7	827.6	828.5	829.4	830.3	831.2	832.2	833.1	834.0	7.600
7.700	834.0	834.9	835.8	836.7	837.6	838.5	839.4	840.3	841.3	842.2	843.1	7.700
7.800	843.1	844.0	844.9	845.8	846.7	847.6	848.5	849.4	850.3	851.2	852.1	7.800
7.900	852.1	853.0	853.9	854.9	855.8	856.7	857.6	858.5	859.4	860.3	861.2	7.900
8.000	861.2	862.1	863.0	863.9	864.8	865.7	866.6	867.5	868.4	869.3	870.2	8.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

**Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.****(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
8.000	861.2	862.1	863.0	863.9	864.8	865.7	866.6	867.5	868.4	869.3	870.2	8.000
8.100	870.2	871.1	872.0	872.9	873.8	874.7	875.6	876.5	877.4	878.3	879.2	8.100
8.200	879.2	880.1	881.0	881.9	882.8	883.7	884.6	885.5	886.4	887.3	888.2	8.200
8.300	888.2	889.1	890.0	890.9	891.7	892.6	893.5	894.4	895.3	896.2	897.1	8.300
8.400	897.1	898.0	898.9	899.8	900.7	901.6	902.5	903.4	904.2	905.1	906.0	8.400
8.500	906.0	906.9	907.8	908.7	909.6	910.5	911.4	912.3	913.1	914.0	914.9	8.500
8.600	914.9	915.8	916.7	917.6	918.5	919.4	920.3	921.1	922.0	922.9	923.8	8.600
8.700	923.8	924.7	925.6	926.5	927.3	928.2	929.1	930.0	930.9	931.8	932.6	8.700
8.800	932.6	933.5	934.4	935.3	936.2	937.1	937.9	938.8	939.7	940.6	941.5	8.800
8.900	941.5	942.3	943.2	944.1	945.0	945.9	946.7	947.6	948.5	949.4	950.3	8.900
9.000	950.3	951.1	952.0	952.9	953.8	954.7	955.5	956.4	957.3	958.2	959.0	9.000
9.100	959.0	959.9	960.8	961.7	962.5	963.4	964.3	965.2	966.1	966.9	967.8	9.100
9.200	967.8	968.7	969.5	970.4	971.3	972.2	973.0	973.9	974.8	975.7	976.5	9.200
9.300	976.5	977.4	978.3	979.1	980.0	980.9	981.8	982.6	983.5	984.4	985.2	9.300
9.400	985.2	986.1	987.0	987.8	988.7	989.6	990.5	991.3	992.2	993.1	993.9	9.400
9.500	993.9	994.8	995.7	996.5	997.4	998.3	999.1	1000.0	1000.9	1001.7	1002.6	9.500
9.600	1002.6	1003.5	1004.3	1005.2	1006.0	1006.9	1007.8	1008.6	1009.5	1010.4	1011.2	9.600
9.700	1011.2	1012.1	1013.0	1013.8	1014.7	1015.5	1016.4	1017.3	1018.1	1019.0	1019.8	9.700
9.800	1019.8	1020.7	1021.6	1022.4	1023.3	1024.1	1025.0	1025.9	1026.7	1027.6	1028.4	9.800
9.900	1028.4	1029.3	1030.2	1031.0	1031.9	1032.7	1033.6	1034.5	1035.3	1036.2	1037.0	9.900
10.000	1037.0	1037.9	1038.7	1039.6	1040.5	1041.3	1042.2	1043.0	1043.9	1044.7	1045.6	10.000
10.100	1045.6	1046.4	1047.3	1048.1	1049.0	1049.9	1050.7	1051.6	1052.4	1053.3	1054.1	10.100
10.200	1054.1	1055.0	1055.8	1056.7	1057.5	1058.4	1059.2	1060.1	1060.9	1061.8	1062.6	10.200
10.300	1062.6	1063.5	1064.3	1065.2	1066.0	1066.9	1067.7	1068.6	1069.4	1070.3	1071.1	10.300
10.400	1071.1	1072.0	1072.8	1073.7	1074.5	1075.4	1076.2	1077.1	1077.9	1078.8	1079.6	10.400
10.500	1079.6	1080.4	1081.3	1082.1	1083.0	1083.8	1084.7	1085.5	1086.4	1087.2	1088.1	10.500
10.600	1088.1	1088.9	1089.8	1090.6	1091.5	1092.3	1093.1	1094.0	1094.8	1095.7	1096.5	10.600
10.700	1096.5	1097.4	1098.2	1099.0	1099.9	1100.7	1101.6	1102.4	1103.3	1104.1	1105.0	10.700
10.800	1105.0	1105.8	1106.6	1107.5	1108.3	1109.2	1110.0	1110.8	1111.7	1112.5	1113.4	10.800
10.900	1113.4	1114.2	1115.1	1115.9	1116.7	1117.6	1118.4	1119.3	1120.1	1121.0	1121.8	10.900
11.000	1121.8	1122.6	1123.5	1124.3	1125.2	1126.0	1126.8	1127.7	1128.5	1129.3	1130.2	11.000
11.100	1130.2	1131.0	1131.9	1132.7	1133.5	1134.4	1135.2	1136.1	1136.9	1137.7	1138.6	11.100
11.200	1138.6	1139.4	1140.3	1141.1	1141.9	1142.8	1143.6	1144.4	1145.3	1146.1	1147.0	11.200
11.300	1147.0	1147.8	1148.6	1149.5	1150.3	1151.1	1152.0	1152.8	1153.7	1154.5	1155.3	11.300
11.400	1155.3	1156.2	1157.0	1157.8	1158.7	1159.5	1160.4	1161.2	1162.0	1162.9	1163.7	11.400
11.500	1163.7	1164.5	1165.4	1166.2	1167.0	1167.9	1168.7	1169.5	1170.4	1171.2	1172.0	11.500
11.600	1172.0	1172.9	1173.7	1174.6	1175.4	1176.2	1177.1	1177.9	1178.7	1179.6	1180.4	11.600
11.700	1180.4	1181.2	1182.1	1182.9	1183.7	1184.6	1185.4	1186.2	1187.1	1187.9	1188.7	11.700
11.800	1188.7	1189.6	1190.4	1191.2	1192.1	1192.9	1193.7	1194.6	1195.4	1196.2	1197.1	11.800
11.900	1197.1	1197.9	1198.7	1199.6	1200.4	1201.2	1202.1	1202.9	1203.7	1204.6	1205.4	11.900
12.000	1205.4	1206.2	1207.1	1207.9	1208.7	1209.6	1210.4	1211.2	1212.1	1212.9	1213.7	12.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

**Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
12.000	1205.4	1206.2	1207.1	1207.9	1208.7	1209.6	1210.4	1211.2	1212.1	1212.9	1213.7	12.000
12.100	1213.7	1214.6	1215.4	1216.2	1217.1	1217.9	1218.7	1219.5	1220.4	1221.2	1222.0	12.100
12.200	1222.0	1222.9	1223.7	1224.5	1225.4	1226.2	1227.0	1227.9	1228.7	1229.5	1230.4	12.200
12.300	1230.4	1231.2	1232.0	1232.9	1233.7	1234.5	1235.4	1236.2	1237.0	1237.8	1238.7	12.300
12.400	1238.7	1239.5	1240.3	1241.2	1242.0	1242.8	1243.7	1244.5	1245.3	1246.2	1247.0	12.400
12.500	1247.0	1247.8	1248.7	1249.5	1250.3	1251.1	1252.0	1252.8	1253.6	1254.5	1255.3	12.500
12.600	1255.3	1256.1	1257.0	1257.8	1258.6	1259.5	1260.3	1261.1	1261.9	1262.8	1263.6	12.600
12.700	1263.6	1264.4	1265.3	1266.1	1266.9	1267.8	1268.6	1269.4	1270.2	1271.1	1271.9	12.700
12.800	1271.9	1272.7	1273.6	1274.4	1275.2	1276.1	1276.9	1277.7	1278.6	1279.4	1280.2	12.800
12.900	1280.2	1281.1	1281.9	1282.7	1283.6	1284.4	1285.2	1286.0	1286.9	1287.7	1288.5	12.900
13.000	1288.5	1289.4	1290.2	1291.0	1291.9	1292.7	1293.5	1294.4	1295.2	1296.0	1296.9	13.000
13.100	1296.9	1297.7	1298.5	1299.4	1300.2	1301.0	1301.9	1302.7	1303.5	1304.4	1305.2	13.100
13.200	1305.2	1306.0	1306.8	1307.7	1308.5	1309.3	1310.2	1311.0	1311.8	1312.7	1313.5	13.200
13.300	1313.5	1314.3	1315.2	1316.0	1316.8	1317.7	1318.5	1319.3	1320.2	1321.0	1321.8	13.300
13.400	1321.8	1322.7	1323.5	1324.3	1325.2	1326.0	1326.8	1327.7	1328.5	1329.3	1330.2	13.400
13.500	1330.2	1331.0	1331.8	1332.7	1333.5	1334.3	1335.2	1336.0	1336.8	1337.7	1338.5	13.500
13.600	1338.5	1339.3	1340.2	1341.0	1341.8	1342.7	1343.5	1344.3	1345.2	1346.0	1346.8	13.600
13.700	1346.8	1347.7	1348.5	1349.3	1350.2	1351.0	1351.8	1352.7	1353.5	1354.3	1355.2	13.700
13.800	1355.2	1356.0	1356.8	1357.7	1358.5	1359.3	1360.2	1361.0	1361.8	1362.7	1363.5	13.800
13.900	1363.5	1364.3	1365.2	1366.0	1366.9	1367.7	1368.5	1369.4	1370.2	1371.0	1371.9	13.900
14.000	1371.9	1372.7	1373.5	1374.4	1375.2	1376.0	1376.9	1377.7	1378.5	1379.4	1380.2	14.000
14.100	1380.2	1381.0	1381.9	1382.7	1383.5	1384.4	1385.2	1386.1	1386.9	1387.7	1388.6	14.100
14.200	1388.6	1389.4	1390.2	1391.1	1391.9	1392.7	1393.6	1394.4	1395.2	1396.1	1396.9	14.200
14.300	1396.9	1397.7	1398.6	1399.4	1400.2	1401.1	1401.9	1402.8	1403.6	1404.4	1405.3	14.300
14.400	1405.3	1406.1	1406.9	1407.8	1408.6	1409.4	1410.3	1411.1	1411.9	1412.8	1413.6	14.400
14.500	1413.6	1414.5	1415.3	1416.1	1417.0	1417.8	1418.6	1419.5	1420.3	1421.2	1422.0	14.500
14.600	1422.0	1422.8	1423.7	1424.5	1425.3	1426.2	1427.0	1427.9	1428.7	1429.5	1430.4	14.600
14.700	1430.4	1431.2	1432.0	1432.9	1433.7	1434.5	1435.4	1436.2	1437.1	1437.9	1438.7	14.700
14.800	1438.7	1439.6	1440.4	1441.2	1442.1	1442.9	1443.8	1444.6	1445.4	1446.3	1447.1	14.800
14.900	1447.1	1447.9	1448.8	1449.6	1450.5	1451.3	1452.1	1453.0	1453.8	1454.6	1455.5	14.900
15.000	1455.5	1456.3	1457.2	1458.0	1458.8	1459.7	1460.5	1461.4	1462.2	1463.0	1463.9	15.000
15.100	1463.9	1464.7	1465.5	1466.4	1467.2	1468.1	1468.9	1469.7	1470.6	1471.4	1472.3	15.100
15.200	1472.3	1473.1	1473.9	1474.8	1475.6	1476.5	1477.3	1478.1	1479.0	1479.8	1480.7	15.200
15.300	1480.7	1481.5	1482.3	1483.2	1484.0	1484.8	1485.7	1486.5	1487.4	1488.2	1489.0	15.300
15.400	1489.0	1489.9	1490.7	1491.6	1492.4	1493.2	1494.1	1494.9	1495.8	1496.6	1497.5	15.400
15.500	1497.5	1498.3	1499.1	1500.0	1500.8	1501.7	1502.5	1503.3	1504.2	1505.0	1505.9	15.500
15.600	1505.9	1506.7	1507.5	1508.4	1509.2	1510.1	1510.9	1511.7	1512.6	1513.4	1514.3	15.600
15.700	1514.3	1515.1	1516.0	1516.8	1517.6	1518.5	1519.3	1520.2	1521.0	1521.8	1522.7	15.700
15.800	1522.7	1523.5	1524.4	1525.2	1526.1	1526.9	1527.7	1528.6	1529.4	1530.3	1531.1	15.800
15.900	1531.1	1532.0	1532.8	1533.6	1534.5	1535.3	1536.2	1537.0	1537.8	1538.7	1539.5	15.900
16.000	1539.5	1540.4	1541.2	1542.1	1542.9	1543.8	1544.6	1545.4	1546.3	1547.1	1548.0	16.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

**Table 1. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

**Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
<b>16.000</b>	1539.5	1540.4	1541.2	1542.1	1542.9	1543.8	1544.6	1545.4	1546.3	1547.1	1548.0	<b>16.000</b>
<b>16.100</b>	1548.0	1548.8	1549.7	1550.5	1551.3	1552.2	1553.0	1553.9	1554.7	1555.6	1556.4	<b>16.100</b>
<b>16.200</b>	1556.4	1557.2	1558.1	1558.9	1559.8	1560.6	1561.5	1562.3	1563.2	1564.0	1564.8	<b>16.200</b>
<b>16.300</b>	1564.8	1565.7	1566.5	1567.4	1568.2	1569.1	1569.9	1570.8	1571.6	1572.4	1573.3	<b>16.300</b>
<b>16.400</b>	1573.3	1574.1	1575.0	1575.8	1576.7	1577.5	1578.4	1579.2	1580.1	1580.9	1581.8	<b>16.400</b>
<b>16.500</b>	1581.8	1582.6	1583.4	1584.3	1585.1	1586.0	1586.8	1587.7	1588.5	1589.4	1590.2	<b>16.500</b>
<b>16.600</b>	1590.2	1591.1	1591.9	1592.8	1593.6	1594.4	1595.3	1596.1	1597.0	1597.8	1598.7	<b>16.600</b>
<b>16.700</b>	1598.7	1599.5	1600.4	1601.2	1602.1	1602.9	1603.8	1604.6	1605.5	1606.3	1607.1	<b>16.700</b>
<b>16.800</b>	1607.1	1608.0	1608.8	1609.7	1610.5	1611.4	1612.2	1613.1	1613.9	1614.8	1615.6	<b>16.800</b>
<b>16.900</b>	1615.6	1616.5	1617.3	1618.2	1619.0	1619.9	1620.7	1621.6	1622.4	1623.3	1624.1	<b>16.900</b>
<b>17.000</b>	1624.1	1625.0	1625.8	1626.7	1627.5	1628.4	1629.2	1630.1	1630.9	1631.8	1632.6	<b>17.000</b>
<b>17.100</b>	1632.6	1633.5	1634.3	1635.2	1636.0	1636.9	1637.7	1638.6	1639.4	1640.3	1641.1	<b>17.100</b>
<b>17.200</b>	1641.1	1642.0	1642.8	1643.7	1644.5	1645.4	1646.2	1647.1	1647.9	1648.8	1649.6	<b>17.200</b>
<b>17.300</b>	1649.6	1650.5	1651.3	1652.2	1653.0	1653.9	1654.7	1655.6	1656.4	1657.3	1658.1	<b>17.300</b>
<b>17.400</b>	1658.1	1659.0	1659.8	1660.7	1661.5	1662.4	1663.2	1664.1	1664.9	1665.8	1666.6	<b>17.400</b>
<b>17.500</b>	1666.6	1667.5	1668.3	1669.2	1670.0	1670.9	1671.8	1672.6	1673.5	1674.3	1675.2	<b>17.500</b>
<b>17.600</b>	1675.2	1676.0	1676.9	1677.7	1678.6	1679.4	1680.3	1681.1	1682.0	1682.8	1683.7	<b>17.600</b>
<b>17.700</b>	1683.7	1684.6	1685.4	1686.3	1687.1	1688.0	1688.8	1689.7	1690.5	1691.4	1692.2	<b>17.700</b>
<b>17.800</b>	1692.2	1693.1	1693.9	1694.8	1695.7	1696.5	1697.4	1698.2	1699.1	1699.9	1700.8	<b>17.800</b>
<b>17.900</b>	1700.8	1701.6	1702.5	1703.4	1704.2	1705.1	1705.9	1706.8	1707.6	1708.5	1709.3	<b>17.900</b>
<b>18.000</b>	1709.3	1710.2	1711.1	1711.9	1712.8	1713.6	1714.5	1715.3	1716.2	1717.1	1717.9	<b>18.000</b>
<b>18.100</b>	1717.9	1718.8	1719.6	1720.5	1721.3	1722.2	1723.0	1723.9	1724.8	1725.6	1726.5	<b>18.100</b>
<b>18.200</b>	1726.5	1727.3	1728.2	1729.0	1729.9	1730.8	1731.6	1732.5	1733.3	1734.2	1735.1	<b>18.200</b>
<b>18.300</b>	1735.1	1735.9	1736.8	1737.6	1738.5	1739.3	1740.2	1741.1	1741.9	1742.8	1743.6	<b>18.300</b>
<b>18.400</b>	1743.6	1744.5	1745.4	1746.2	1747.1	1747.9	1748.8	1749.7	1750.5	1751.4	1752.2	<b>18.400</b>
<b>18.500</b>	1752.2	1753.1	1754.0	1754.8	1755.7	1756.5	1757.4	1758.3	1759.1	1760.0	1760.8	<b>18.500</b>
<b>18.600</b>	1760.8	1761.7	1762.6	1763.4	1764.3	1765.1	1766.0	1766.9	1767.7	1768.6	-----	<b>18.600</b>
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

# Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	1	2	3	4	5	6	7	8	9	10	° C
Millivolts												
0	0.000	0.005	0.011	0.016	0.022	0.028	0.033	0.039	0.044	0.050	0.056	0
10	.056	.061	.067	.073	.078	.084	.090	.096	.102	.107	.113	10
20	.113	.119	.125	.131	.137	.143	.149	.155	.161	.167	.173	20
30	.173	.179	.185	.191	.198	.204	.210	.216	.222	.229	.235	30
40	.235	.241	.247	.254	.260	.266	.273	.279	.286	.292	.299	40
50	.299	.305	.312	.318	.325	.331	.338	.344	.351	.357	.364	50
60	.364	.371	.377	.384	.391	.397	.404	.411	.418	.425	.431	60
70	.431	.438	.445	.452	.459	.466	.473	.479	.486	.493	.500	70
80	.500	.507	.514	.521	.528	.535	.543	.550	.557	.564	.571	80
90	.571	.578	.585	.593	.600	.607	.614	.621	.629	.636	.643	90
100	.643	.651	.658	.665	.673	.680	.687	.694	.702	.709	.717	100
110	.717	.724	.732	.739	.747	.754	.762	.769	.777	.784	.792	110
120	.792	.800	.807	.815	.823	.830	.838	.845	.853	.861	.869	120
130	.869	.876	.884	.892	.900	.907	.915	.923	.931	.939	.946	130
140	.946	.954	.962	.970	.978	.986	.994	1.002	1.009	1.017	1.025	140
150	1.025	1.033	1.041	1.049	1.057	1.065	1.073	1.081	1.089	1.097	1.106	150
160	1.106	1.114	1.122	1.130	1.138	1.146	1.154	1.162	1.170	1.179	1.187	160
170	1.187	1.195	1.203	1.211	1.220	1.228	1.236	1.244	1.253	1.261	1.269	170
180	1.269	1.277	1.286	1.294	1.302	1.311	1.319	1.327	1.336	1.344	1.352	180
190	1.352	1.361	1.369	1.377	1.386	1.394	1.403	1.411	1.419	1.428	1.436	190
200	1.436	1.445	1.453	1.462	1.470	1.479	1.487	1.496	1.504	1.513	1.521	200
210	1.521	1.530	1.538	1.547	1.555	1.564	1.573	1.581	1.590	1.598	1.607	210
220	1.607	1.615	1.624	1.633	1.641	1.650	1.659	1.667	1.676	1.685	1.693	220
230	1.693	1.702	1.710	1.719	1.728	1.736	1.745	1.754	1.763	1.771	1.780	230
240	1.780	1.789	1.798	1.806	1.815	1.824	1.833	1.841	1.850	1.859	1.868	240
250	1.868	1.877	1.885	1.894	1.903	1.912	1.921	1.930	1.938	1.947	1.956	250
260	1.956	1.965	1.974	1.983	1.992	2.001	2.009	2.018	2.027	2.036	2.045	260
270	2.045	2.054	2.063	2.072	2.081	2.090	2.099	2.108	2.117	2.126	2.135	270
280	2.135	2.144	2.153	2.162	2.171	2.180	2.189	2.198	2.207	2.216	2.225	280
290	2.225	2.234	2.243	2.252	2.261	2.271	2.280	2.289	2.298	2.307	2.316	290
300	2.316	2.325	2.334	2.343	2.353	2.362	2.371	2.380	2.389	2.398	2.408	300
310	2.408	2.417	2.426	2.435	2.444	2.453	2.463	2.472	2.481	2.490	2.499	310
320	2.499	2.509	2.518	2.527	2.536	2.546	2.555	2.564	2.573	2.583	2.592	320
330	2.592	2.601	2.610	2.620	2.629	2.638	2.648	2.657	2.666	2.676	2.685	330
340	2.685	2.694	2.704	2.713	2.722	2.731	2.741	2.750	2.760	2.769	2.778	340
350	2.778	2.788	2.797	2.806	2.816	2.825	2.834	2.844	2.853	2.863	2.872	350
360	2.872	2.881	2.891	2.900	2.910	2.919	2.929	2.938	2.947	2.957	2.966	360
370	2.966	2.976	2.985	2.995	3.004	3.014	3.023	3.032	3.042	3.051	3.061	370
380	3.061	3.070	3.080	3.089	3.099	3.108	3.118	3.127	3.137	3.146	3.156	380
390	3.156	3.165	3.175	3.184	3.194	3.203	3.213	3.222	3.232	3.241	3.251	390
400	3.251	3.261	3.270	3.280	3.289	3.299	3.308	3.318	3.327	3.337	3.347	400
° C	0	1	2	3	4	5	6	7	8	9	10	° C

**Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	1	2	3	4	5	6	7	8	9	10	° C
Millivolts												
400	3. 251	3. 261	3. 270	3. 280	3. 289	3. 299	3. 308	3. 318	3. 327	3. 337	3. 347	400
410	3. 347	3. 356	3. 366	3. 375	3. 385	3. 394	3. 404	3. 414	3. 423	3. 433	3. 442	410
420	3. 442	3. 452	3. 462	3. 471	3. 481	3. 490	3. 500	3. 510	3. 519	3. 529	3. 539	420
430	3. 539	3. 548	3. 558	3. 567	3. 577	3. 587	3. 596	3. 606	3. 616	3. 625	3. 635	430
440	3. 635	3. 645	3. 654	3. 664	3. 674	3. 683	3. 693	3. 703	3. 712	3. 722	3. 732	440
450	3. 732	3. 741	3. 751	3. 761	3. 771	3. 780	3. 790	3. 800	3. 809	3. 819	3. 829	450
460	3. 829	3. 839	3. 848	3. 858	3. 868	3. 878	3. 887	3. 897	3. 907	3. 917	3. 926	460
470	3. 926	3. 936	3. 946	3. 956	3. 965	3. 975	3. 985	3. 995	4. 004	4. 014	4. 024	470
480	4. 024	4. 034	4. 044	4. 053	4. 063	4. 073	4. 083	4. 093	4. 103	4. 112	4. 122	480
490	4. 122	4. 132	4. 142	4. 152	4. 162	4. 171	4. 181	4. 191	4. 201	4. 211	4. 221	490
500	4. 221	4. 230	4. 240	4. 250	4. 260	4. 270	4. 280	4. 290	4. 300	4. 310	4. 319	500
510	4. 319	4. 329	4. 339	4. 349	4. 359	4. 369	4. 379	4. 389	4. 399	4. 409	4. 419	510
520	4. 419	4. 428	4. 438	4. 448	4. 458	4. 468	4. 478	4. 488	4. 498	4. 508	4. 518	520
530	4. 518	4. 528	4. 538	4. 548	4. 558	4. 568	4. 578	4. 588	4. 598	4. 608	4. 618	530
540	4. 618	4. 628	4. 638	4. 648	4. 658	4. 668	4. 678	4. 688	4. 698	4. 708	4. 718	540
550	4. 718	4. 728	4. 738	4. 748	4. 758	4. 768	4. 778	4. 788	4. 798	4. 808	4. 818	550
560	4. 818	4. 828	4. 839	4. 849	4. 859	4. 869	4. 879	4. 889	4. 899	4. 909	4. 919	560
570	4. 919	4. 929	4. 939	4. 950	4. 960	4. 970	4. 980	4. 990	5. 000	5. 010	5. 020	570
580	5. 020	5. 031	5. 041	5. 051	5. 061	5. 071	5. 081	5. 091	5. 102	5. 112	5. 122	580
590	5. 122	5. 132	5. 142	5. 152	5. 163	5. 173	5. 183	5. 193	5. 203	5. 214	5. 224	590
600	5. 224	5. 234	5. 244	5. 254	5. 265	5. 275	5. 285	5. 295	5. 306	5. 316	5. 326	600
610	5. 326	5. 336	5. 346	5. 357	5. 367	5. 377	5. 388	5. 398	5. 408	5. 418	5. 429	610
620	5. 429	5. 439	5. 449	5. 459	5. 470	5. 480	5. 490	5. 501	5. 511	5. 521	5. 532	620
630	5. 532	5. 542	5. 552	5. 563	5. 573	5. 583	5. 593	5. 604	5. 614	5. 624	5. 635	630
640	5. 635	5. 645	5. 655	5. 666	5. 676	5. 686	5. 697	5. 707	5. 717	5. 728	5. 738	640
650	5. 738	5. 748	5. 759	5. 769	5. 779	5. 790	5. 800	5. 811	5. 821	5. 831	5. 842	650
660	5. 842	5. 852	5. 862	5. 873	5. 883	5. 894	5. 904	5. 914	5. 925	5. 935	5. 946	660
670	5. 946	5. 956	5. 967	5. 977	5. 987	5. 998	6. 008	6. 019	6. 029	6. 040	6. 050	670
680	6. 050	6. 060	6. 071	6. 081	6. 092	6. 102	6. 113	6. 123	6. 134	6. 144	6. 155	680
690	6. 155	6. 165	6. 176	6. 186	6. 197	6. 207	6. 218	6. 228	6. 239	6. 249	6. 260	690
700	6. 260	6. 270	6. 281	6. 291	6. 302	6. 312	6. 323	6. 333	6. 344	6. 355	6. 365	700
710	6. 365	6. 376	6. 386	6. 397	6. 407	6. 418	6. 429	6. 439	6. 450	6. 460	6. 471	710
720	6. 471	6. 481	6. 492	6. 503	6. 513	6. 524	6. 534	6. 545	6. 556	6. 566	6. 577	720
730	6. 577	6. 588	6. 598	6. 609	6. 619	6. 630	6. 641	6. 651	6. 662	6. 673	6. 683	730
740	6. 683	6. 694	6. 705	6. 715	6. 726	6. 737	6. 747	6. 758	6. 769	6. 779	6. 790	740
750	6. 790	6. 801	6. 811	6. 822	6. 833	6. 844	6. 854	6. 865	6. 876	6. 886	6. 897	750
760	6. 897	6. 908	6. 919	6. 929	6. 940	6. 951	6. 962	6. 972	6. 983	6. 994	7. 005	760
770	7. 005	7. 015	7. 026	7. 037	7. 047	7. 058	7. 069	7. 080	7. 091	7. 102	7. 112	770
780	7. 112	7. 123	7. 134	7. 145	7. 156	7. 166	7. 177	7. 188	7. 199	7. 210	7. 220	780
790	7. 220	7. 231	7. 242	7. 253	7. 264	7. 275	7. 286	7. 296	7. 307	7. 318	7. 329	790
800	7. 329	7. 340	7. 351	7. 362	7. 372	7. 383	7. 394	7. 405	7. 416	7. 427	7. 438	800
° C	0	1	2	3	4	5	6	7	8	9	10	° C

**Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
Millivolts												
800	7.329	7.340	7.351	7.362	7.372	7.383	7.394	7.405	7.416	7.427	7.438	800
810	7.438	7.449	7.460	7.470	7.481	7.492	7.503	7.514	7.525	7.536	7.547	810
820	7.547	7.558	7.569	7.580	7.591	7.602	7.613	7.623	7.634	7.645	7.656	820
830	7.656	7.667	7.678	7.689	7.700	7.711	7.722	7.733	7.744	7.755	7.766	830
840	7.766	7.777	7.788	7.799	7.810	7.821	7.832	7.843	7.854	7.865	7.876	840
850	7.876	7.887	7.898	7.910	7.921	7.932	7.943	7.954	7.965	7.976	7.987	850
860	7.987	7.998	8.009	8.020	8.031	8.042	8.053	8.064	8.076	8.087	8.098	860
870	8.098	8.109	8.120	8.131	8.142	8.153	8.164	8.176	8.187	8.198	8.209	870
880	8.209	8.220	8.231	8.242	8.254	8.265	8.276	8.287	8.298	8.309	8.320	880
890	8.320	8.332	8.343	8.354	8.365	8.376	8.388	8.399	8.410	8.421	8.432	890
900	8.432	8.444	8.455	8.466	8.477	8.488	8.500	8.511	8.522	8.533	8.545	900
910	8.545	8.556	8.567	8.578	8.590	8.601	8.612	8.623	8.635	8.646	8.657	910
920	8.657	8.668	8.680	8.691	8.702	8.714	8.725	8.736	8.747	8.759	8.770	920
930	8.770	8.781	8.793	8.804	8.815	8.827	8.838	8.849	8.861	8.872	8.883	930
940	8.883	8.895	8.906	8.917	8.929	8.940	8.951	8.963	8.974	8.986	8.997	940
950	8.997	9.008	9.020	9.031	9.042	9.054	9.065	9.077	9.088	9.099	9.111	950
960	9.111	9.122	9.134	9.145	9.157	9.168	9.179	9.191	9.202	9.214	9.225	960
970	9.225	9.236	9.248	9.260	9.271	9.282	9.294	9.305	9.317	9.328	9.340	970
980	9.340	9.351	9.363	9.374	9.386	9.397	9.409	9.420	9.432	9.443	9.455	980
990	9.455	9.466	9.478	9.489	9.501	9.512	9.524	9.535	9.547	9.559	9.570	990
1,000	9.570	9.582	9.593	9.605	9.616	9.628	9.639	9.651	9.663	9.674	9.686	1,000
1,010	9.686	9.697	9.709	9.720	9.732	9.744	9.755	9.767	9.779	9.790	9.802	1,010
1,020	9.802	9.813	9.825	9.837	9.848	9.860	9.871	9.883	9.895	9.906	9.918	1,020
1,030	9.918	9.930	9.941	9.953	9.965	9.976	9.988	10.000	10.011	10.023	10.035	1,030
1,040	10.035	10.046	10.058	10.070	10.082	10.093	10.105	10.117	10.128	10.140	10.152	1,040
1,050	10.152	10.163	10.175	10.187	10.199	10.210	10.222	10.234	10.246	10.257	10.269	1,050
1,060	10.269	10.281	10.293	10.304	10.316	10.328	10.340	10.351	10.363	10.375	10.387	1,060
1,070	10.387	10.399	10.410	10.422	10.434	10.446	10.458	10.469	10.481	10.493	10.505	1,070
1,080	10.505	10.517	10.528	10.540	10.552	10.564	10.576	10.587	10.599	10.611	10.623	1,080
1,090	10.623	10.635	10.647	10.658	10.670	10.682	10.694	10.706	10.718	10.729	10.741	1,090
1,100	10.741	10.753	10.765	10.777	10.789	10.801	10.812	10.824	10.836	10.848	10.860	1,100
1,110	10.860	10.872	10.884	10.896	10.907	10.919	10.931	10.943	10.955	10.967	10.979	1,110
1,120	10.979	10.991	11.003	11.014	11.026	11.038	11.050	11.062	11.074	11.086	11.098	1,120
1,130	11.098	11.110	11.122	11.133	11.145	11.157	11.169	11.181	11.193	11.205	11.217	1,130
1,140	11.217	11.229	11.241	11.253	11.265	11.277	11.289	11.300	11.312	11.324	11.336	1,140
1,150	11.336	11.348	11.360	11.372	11.384	11.396	11.408	11.420	11.432	11.444	11.456	1,150
1,160	11.456	11.468	11.480	11.492	11.504	11.516	11.528	11.540	11.552	11.564	11.575	1,160
1,170	11.575	11.587	11.599	11.611	11.623	11.635	11.647	11.659	11.671	11.683	11.695	1,170
1,180	11.695	11.707	11.719	11.731	11.743	11.755	11.767	11.779	11.791	11.803	11.815	1,180
1,190	11.815	11.827	11.839	11.851	11.863	11.875	11.887	11.899	11.911	11.923	11.935	1,190
1,200	11.935	11.947	11.959	11.971	11.983	11.995	12.007	12.019	12.031	12.043	12.055	1,200
°C	0	1	2	3	4	5	6	7	8	9	10	°C

**Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	1	2	3	4	5	6	7	8	9	10	° C
Millivolts												
1, 200	11. 935	11. 947	11. 959	11. 971	11. 983	11. 995	12. 007	12. 019	12. 031	12. 043	12. 055	1, 200
1, 210	12. 055	12. 067	12. 079	12. 091	12. 103	12. 115	12. 127	12. 139	12. 151	12. 163	12. 175	1, 210
1, 220	12. 175	12. 187	12. 200	12. 212	12. 224	12. 236	12. 248	12. 260	12. 272	12. 284	12. 296	1, 220
1, 230	12. 296	12. 308	12. 320	12. 332	12. 344	12. 356	12. 368	12. 380	12. 392	12. 404	12. 416	1, 230
1, 240	12. 416	12. 428	12. 440	12. 452	12. 464	12. 476	12. 488	12. 500	12. 512	12. 524	12. 536	1, 240
1, 250	12. 536	12. 548	12. 560	12. 573	12. 585	12. 597	12. 609	12. 621	12. 633	12. 645	12. 657	1, 250
1, 260	12. 657	12. 669	12. 681	12. 693	12. 705	12. 717	12. 729	12. 741	12. 753	12. 765	12. 777	1, 260
1, 270	12. 777	12. 789	12. 801	12. 813	12. 825	12. 837	12. 849	12. 861	12. 873	12. 885	12. 897	1, 270
1, 280	12. 897	12. 909	12. 921	12. 933	12. 945	12. 957	12. 969	12. 981	12. 993	13. 005	13. 018	1, 280
1, 290	13. 018	13. 030	13. 042	13. 054	13. 066	13. 078	13. 090	13. 102	13. 114	13. 126	13. 138	1, 290
1, 300	13. 138	13. 150	13. 162	13. 174	13. 186	13. 198	13. 210	13. 222	13. 234	13. 246	13. 258	1, 300
1, 310	13. 258	13. 270	13. 282	13. 294	13. 306	13. 318	13. 330	13. 342	13. 354	13. 366	13. 378	1, 310
1, 320	13. 378	13. 390	13. 402	13. 414	13. 426	13. 438	13. 450	13. 462	13. 474	13. 486	13. 498	1, 320
1, 330	13. 498	13. 510	13. 522	13. 534	13. 546	13. 558	13. 570	13. 582	13. 594	13. 606	13. 618	1, 330
1, 340	13. 618	13. 630	13. 642	13. 654	13. 666	13. 678	13. 690	13. 702	13. 714	13. 726	13. 738	1, 340
1, 350	13. 738	13. 750	13. 762	13. 774	13. 786	13. 798	13. 810	13. 822	13. 834	13. 846	13. 858	1, 350
1, 360	13. 858	13. 870	13. 882	13. 894	13. 906	13. 918	13. 930	13. 942	13. 954	13. 966	13. 978	1, 360
1, 370	13. 978	13. 990	14. 002	14. 014	14. 026	14. 038	14. 050	14. 062	14. 074	14. 086	14. 098	1, 370
1, 380	14. 098	14. 110	14. 122	14. 133	14. 145	14. 157	14. 169	14. 181	14. 193	14. 205	14. 217	1, 380
1, 390	14. 217	14. 229	14. 241	14. 253	14. 265	14. 277	14. 289	14. 301	14. 313	14. 325	14. 337	1, 390
1, 400	14. 337	14. 349	14. 361	14. 373	14. 385	14. 397	14. 409	14. 421	14. 433	14. 445	14. 457	1, 400
1, 410	14. 457	14. 469	14. 481	14. 493	14. 504	14. 516	14. 528	14. 540	14. 552	14. 564	14. 576	1, 410
1, 420	14. 576	14. 588	14. 600	14. 612	14. 624	14. 636	14. 648	14. 660	14. 672	14. 684	14. 696	1, 420
1, 430	14. 696	14. 708	14. 720	14. 732	14. 744	14. 755	14. 767	14. 779	14. 791	14. 803	14. 815	1, 430
1, 440	14. 815	14. 827	14. 839	14. 851	14. 863	14. 875	14. 887	14. 899	14. 911	14. 923	14. 935	1, 440
1, 450	14. 935	14. 946	14. 958	14. 970	14. 982	14. 994	15. 006	15. 018	15. 030	15. 042	15. 054	1, 450
1, 460	15. 054	15. 066	15. 078	15. 090	15. 102	15. 113	15. 125	15. 137	15. 149	15. 161	15. 173	1, 460
1, 470	15. 173	15. 185	15. 197	15. 209	15. 221	15. 233	15. 245	15. 256	15. 268	15. 280	15. 292	1, 470
1, 480	15. 292	15. 304	15. 316	15. 328	15. 340	15. 352	15. 364	15. 376	15. 387	15. 399	15. 411	1, 480
1, 490	15. 411	15. 423	15. 435	15. 447	15. 459	15. 471	15. 483	15. 495	15. 507	15. 518	15. 530	1, 490
1, 500	15. 530	15. 542	15. 554	15. 566	15. 578	15. 590	15. 602	15. 614	15. 625	15. 637	15. 649	1, 500
1, 510	15. 649	15. 661	15. 673	15. 685	15. 697	15. 709	15. 721	15. 732	15. 744	15. 756	15. 768	1, 510
1, 520	15. 768	15. 780	15. 792	15. 804	15. 816	15. 827	15. 839	15. 851	15. 863	15. 875	15. 887	1, 520
1, 530	15. 887	15. 899	15. 911	15. 922	15. 934	15. 946	15. 958	15. 970	15. 982	15. 994	16. 006	1, 530
1, 540	16. 006	16. 017	16. 029	16. 041	16. 053	16. 065	16. 077	16. 089	16. 100	16. 112	16. 124	1, 540
1, 550	16. 124	16. 136	16. 148	16. 160	16. 171	16. 183	16. 195	16. 207	16. 219	16. 231	16. 243	1, 550
1, 560	16. 243	16. 254	16. 266	16. 278	16. 290	16. 302	16. 314	16. 325	16. 337	16. 349	16. 361	1, 560
1, 570	16. 361	16. 373	16. 385	16. 396	16. 408	16. 420	16. 432	16. 444	16. 456	16. 467	16. 479	1, 570
1, 580	16. 479	16. 491	16. 503	16. 515	16. 527	16. 538	16. 550	16. 562	16. 574	16. 586	16. 597	1, 580
1, 590	16. 597	16. 609	16. 621	16. 633	16. 645	16. 657	16. 668	16. 680	16. 692	16. 704	16. 716	1, 590
1, 600	16. 716	16. 727	16. 739	16. 751	16. 763	16. 775	16. 786	16. 798	16. 810	16. 822	16. 834	1, 600
° C	0	1	2	3	4	5	6	7	8	9	10	° C



**Table 2. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	1	2	3	4	5	6	7	8	9	10	° C
	Millivolts											
1,600	16.716	16.727	16.739	16.751	16.763	16.775	16.786	16.798	16.810	16.822	16.834	1,600
1,610	16.834	16.845	16.857	16.869	16.881	16.893	16.904	16.916	16.928	16.940	16.952	1,610
1,620	16.952	16.963	16.975	16.987	16.999	17.010	17.022	17.034	17.046	17.058	17.069	1,620
1,630	17.069	17.081	17.093	17.105	17.116	17.128	17.140	17.152	17.163	17.175	17.187	1,630
1,640	17.187	17.199	17.211	17.222	17.234	17.246	17.258	17.269	17.281	17.293	17.305	1,640
1,650	17.305	17.316	17.328	17.340	17.352	17.363	17.375	17.387	17.398	17.410	17.422	1,650
1,660	17.422	17.434	17.446	17.457	17.469	17.481	17.492	17.504	17.516	17.528	17.539	1,660
1,670	17.539	17.551	17.563	17.575	17.586	17.598	17.610	17.621	17.633	17.645	17.657	1,670
1,680	17.657	17.668	17.680	17.692	17.704	17.715	17.727	17.739	17.750	17.762	17.774	1,680
1,690	17.774	17.785	17.797	17.809	17.821	17.832	17.844	17.856	17.867	17.879	17.891	1,690
1,700	17.891	17.902	17.914	17.926	17.938	17.949	17.961	17.973	17.984	17.996	18.008	1,700
1,710	18.008	18.019	18.031	18.043	18.054	18.066	18.078	18.089	18.101	18.113	18.124	
1,720	18.124	18.136	18.148	18.159	18.171	18.183	18.194	18.206	18.218	18.229	18.241	
1,730	18.241	18.253	18.264	18.276	18.288	18.299	18.311	18.323	18.334	18.346	18.358	
1,740	18.358	18.369	18.381	18.393	18.404	18.416	18.427	18.439	18.451	18.462	18.474	1,740
1,750	18.474	18.486	18.497	18.509	18.520	18.532	18.544	18.555	18.567	18.579	18.590	1,750
1,760	18.590	18.602	18.613	18.625	18.637	18.648	18.660	18.672	18.683	18.695	-----	1,760
° C	0	1	2	3	4	5	6	7	8	9	10	° C

# Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0°C.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
0.000	0.0	1.9	3.7	5.6	7.4	9.1	10.9	12.7	14.4	16.2	17.9	0.000
.100	17.9	19.6	21.3	23.0	24.7	26.4	28.0	29.7	31.3	33.0	34.6	.100
.200	34.6	36.2	37.8	39.4	41.0	42.6	44.2	45.7	47.3	48.8	50.4	.200
.300	50.4	51.9	53.5	55.0	56.5	58.0	59.5	61.0	62.5	64.0	65.5	.300
.400	65.5	67.0	68.4	69.9	71.3	72.8	74.2	75.7	77.1	78.6	80.0	.400
.500	80.0	81.4	82.8	84.2	85.6	87.0	88.4	89.7	91.1	92.5	93.9	.500
.600	93.9	95.2	96.6	97.9	99.3	100.6	102.0	103.3	104.6	106.0	107.3	.600
.700	107.3	108.6	109.9	111.2	112.5	113.8	115.1	116.4	117.7	119.0	120.3	.700
.800	120.3	121.6	122.8	124.1	125.4	126.6	127.9	129.1	130.4	131.6	132.9	.800
.900	132.9	134.1	135.4	136.6	137.8	139.1	140.3	141.5	142.8	144.0	145.3	.900
1.000	145.3	146.5	147.7	148.9	150.1	151.4	152.6	153.8	155.0	156.2	157.5	1.000
1.100	157.5	158.7	159.9	161.1	162.3	163.5	164.7	165.9	167.1	168.3	169.5	1.100
1.200	169.5	170.6	171.8	173.0	174.1	175.3	176.5	177.6	178.8	180.0	181.2	1.200
1.300	181.2	182.3	183.5	184.6	185.8	186.9	188.1	189.2	190.3	191.5	192.6	1.300
1.400	192.6	193.8	194.9	196.1	197.2	198.3	199.5	200.6	201.8	202.9	204.0	1.400
1.500	204.0	205.2	206.3	207.4	208.5	209.6	210.8	211.9	213.0	214.1	215.2	1.500
1.600	215.2	216.4	217.5	218.6	219.7	220.8	221.9	223.0	224.1	225.2	226.3	1.600
1.700	226.3	227.4	228.5	229.6	230.7	231.8	232.9	234.0	235.1	236.2	237.2	1.700
1.800	237.2	238.3	239.4	240.5	241.6	242.6	243.7	244.8	245.9	247.0	248.0	1.800
1.900	248.0	249.1	250.2	251.2	252.3	253.4	254.5	255.5	256.6	257.7	258.7	1.900
2.000	258.7	259.8	260.8	261.9	263.0	264.0	265.1	266.1	267.2	268.3	269.3	2.000
2.100	269.3	270.4	271.4	272.5	273.5	274.6	275.6	276.7	277.7	278.8	279.8	2.100
2.200	279.8	280.9	281.9	282.9	284.0	285.0	286.1	287.1	288.1	289.2	290.2	2.200
2.300	290.2	291.2	292.3	293.3	294.3	295.4	296.4	297.4	298.5	299.5	300.5	2.300
2.400	300.5	301.5	302.6	303.6	304.6	305.6	306.6	307.7	308.7	309.7	310.7	2.400
2.500	310.7	311.7	312.8	313.8	314.8	315.8	316.8	317.8	318.9	319.9	320.9	2.500
2.600	320.9	321.9	322.9	323.9	324.9	326.0	327.0	328.0	329.0	330.0	331.0	2.600
2.700	331.0	332.0	333.0	334.0	335.0	336.0	337.0	338.0	339.0	340.0	341.0	2.700
2.800	341.0	342.0	343.0	344.0	345.0	346.0	347.0	348.0	349.0	350.0	351.0	2.800
2.900	351.0	352.0	353.0	354.0	355.0	356.0	356.9	357.9	358.9	359.9	360.9	2.900
3.000	360.9	361.9	362.9	363.9	364.9	365.9	366.8	367.8	368.8	369.8	370.8	3.000
3.100	370.8	371.8	372.8	373.7	374.7	375.7	376.7	377.7	378.7	379.6	380.6	3.100
3.200	380.6	381.6	382.6	383.6	384.5	385.5	386.5	387.5	388.4	389.4	390.4	3.200
3.300	390.4	391.4	392.3	393.3	394.3	395.2	396.2	397.2	398.2	399.1	400.1	3.300
3.400	400.1	401.1	402.0	403.0	404.0	404.9	405.9	406.9	407.9	408.8	409.8	3.400
3.500	409.8	410.8	411.7	412.7	413.6	414.6	415.6	416.5	417.5	418.4	419.4	3.500
3.600	419.4	420.3	421.3	422.3	423.2	424.2	425.1	426.1	427.0	428.0	428.9	3.600
3.700	428.9	429.9	430.8	431.8	432.7	433.7	434.6	435.6	436.5	437.5	438.4	3.700
3.800	438.4	439.4	440.3	441.3	442.2	443.2	444.1	445.0	446.0	446.9	447.9	3.800
3.900	447.9	448.8	449.8	450.7	451.6	452.6	453.5	454.5	455.4	456.3	457.3	3.900
4.000	457.3	458.2	459.2	460.1	461.1	462.0	463.0	463.9	464.9	465.8	466.8	4.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

**Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
4.000	457.3	458.2	459.2	460.1	461.1	462.0	463.0	463.9	464.9	465.8	466.8	4.000
4.100	466.8	467.7	468.7	469.6	470.5	471.5	472.4	473.4	474.3	475.3	476.2	4.100
4.200	476.2	477.1	478.1	479.0	479.9	480.9	481.8	482.8	483.7	484.6	485.6	4.200
4.300	485.6	486.5	487.4	488.4	489.3	490.2	491.2	492.1	493.0	494.0	494.9	4.300
4.400	494.9	495.8	496.8	497.7	498.6	499.5	500.5	501.4	502.3	503.2	504.2	4.400
4.500	504.2	505.1	506.0	506.9	507.8	508.8	509.7	510.6	511.5	512.4	513.4	4.500
4.600	513.4	514.3	515.2	516.1	517.0	517.9	518.8	519.8	520.7	521.6	522.5	4.600
4.700	522.5	523.4	524.3	525.2	526.1	527.1	528.0	528.9	529.8	530.7	531.6	4.700
4.800	531.6	532.5	533.4	534.3	535.2	536.1	537.0	538.0	538.9	539.8	540.7	4.800
4.900	540.7	541.6	542.5	543.4	544.3	545.2	546.1	547.0	547.9	548.8	549.7	4.900
5.000	549.7	550.6	551.5	552.4	553.3	554.2	555.1	556.0	556.9	557.8	558.7	5.000
5.100	558.7	559.6	560.5	561.4	562.3	563.2	564.1	564.9	565.8	566.7	567.6	5.100
5.200	567.6	568.5	569.4	570.3	571.2	572.1	573.0	573.9	574.8	575.7	576.6	5.200
5.300	576.6	577.5	578.4	579.3	580.2	581.1	582.0	582.9	583.8	584.6	585.5	5.300
5.400	585.5	586.4	587.3	588.2	589.1	590.0	590.9	591.8	592.7	593.5	594.4	5.400
5.500	594.4	595.3	596.2	597.1	598.0	598.9	599.7	600.6	601.5	602.4	603.2	5.500
5.600	603.2	604.1	605.0	605.9	606.8	607.6	608.5	609.4	610.3	611.2	612.0	5.600
5.700	612.0	612.9	613.8	614.6	615.5	616.4	617.2	618.1	619.0	619.8	620.7	5.700
5.800	620.7	621.6	622.5	623.3	624.2	625.1	625.9	626.8	627.7	628.6	629.4	5.800
5.900	629.4	630.3	631.2	632.0	632.9	633.8	634.6	635.5	636.4	637.2	638.1	5.900
6.000	638.1	639.0	639.8	640.7	641.6	642.5	643.3	644.2	645.1	645.9	646.8	6.000
6.100	646.8	647.7	648.5	649.4	650.3	651.1	652.0	652.9	653.7	654.6	655.5	6.100
6.200	655.5	656.3	657.2	658.1	659.0	659.8	660.7	661.5	662.4	663.3	664.1	6.200
6.300	664.1	665.0	665.9	666.7	667.6	668.5	669.3	670.2	671.0	671.9	672.7	6.300
6.400	672.7	673.6	674.5	675.3	676.2	677.0	677.9	678.7	679.6	680.4	681.3	6.400
6.500	681.3	682.2	683.0	683.8	684.7	685.5	686.4	687.3	688.1	689.0	689.8	6.500
6.600	689.8	690.7	691.5	692.4	693.2	694.1	694.9	695.8	696.6	697.5	698.3	6.600
6.700	698.3	699.2	700.0	700.8	701.7	702.5	703.4	704.2	705.1	705.9	706.8	6.700
6.800	706.8	707.6	708.5	709.3	710.1	711.0	711.8	712.7	713.5	714.3	715.2	6.800
6.900	715.2	716.0	716.9	717.7	718.6	719.4	720.2	721.1	721.9	722.8	723.6	6.900
7.000	723.6	724.5	725.3	726.1	727.0	727.8	728.7	729.5	730.3	731.2	732.0	7.000
7.100	732.0	732.9	733.7	734.5	735.4	736.2	737.1	737.9	738.7	739.6	740.4	7.100
7.200	740.4	741.3	742.1	742.9	743.8	744.6	745.4	746.3	747.1	747.9	748.7	7.200
7.300	748.7	749.6	750.4	751.2	752.1	752.9	753.7	754.5	755.3	756.2	757.0	7.300
7.400	757.0	757.9	758.7	759.5	760.3	761.2	762.0	762.8	763.6	764.5	765.3	7.400
7.500	765.3	766.1	766.9	767.7	768.6	769.4	770.2	771.0	771.8	772.7	773.5	7.500
7.600	773.5	774.3	775.1	775.9	776.8	777.6	778.4	779.2	780.1	780.9	781.7	7.600
7.700	781.7	782.5	783.3	784.2	785.0	785.8	786.6	787.4	788.3	789.1	789.9	7.700
7.800	789.9	790.7	791.5	792.3	793.2	794.0	794.8	795.6	796.4	797.2	798.0	7.800
7.900	798.0	798.9	799.7	800.5	801.3	802.1	802.9	803.7	804.6	805.4	806.2	7.900
8.000	806.2	807.0	807.8	808.6	809.4	810.2	811.1	811.9	812.7	813.5	814.3	8.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

**Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
8.000	806.2	807.0	807.8	808.6	809.4	810.2	811.1	811.9	812.7	813.5	814.3	8.000
8.100	814.3	815.1	815.9	816.7	817.5	818.4	819.2	820.0	820.8	821.6	822.4	8.100
8.200	822.4	823.2	824.0	824.8	825.6	826.4	827.2	828.1	828.9	829.7	830.5	8.200
8.300	830.5	831.3	832.1	832.9	833.7	834.5	835.3	836.1	836.9	837.7	838.5	8.300
8.400	838.5	839.3	840.1	840.9	841.7	842.5	843.3	844.1	844.9	845.7	846.5	8.400
8.500	846.5	847.3	848.1	848.9	849.7	850.5	851.3	852.1	852.9	853.7	854.5	8.500
8.600	854.5	855.3	856.1	856.9	857.7	858.5	859.3	860.1	860.9	861.7	862.5	8.600
8.700	862.5	863.3	864.1	864.9	865.7	866.5	867.3	868.1	868.9	869.7	870.5	8.700
8.800	870.5	871.2	872.0	872.8	873.6	874.4	875.2	876.0	876.8	877.6	878.4	8.800
8.900	878.4	879.2	879.9	880.7	881.5	882.3	883.1	883.9	884.7	885.5	886.3	8.900
9.000	886.3	887.1	887.9	888.6	889.4	890.2	891.0	891.8	892.6	893.4	894.2	9.000
9.100	894.2	894.9	895.7	896.5	897.3	898.1	898.9	899.6	900.4	901.2	902.0	9.100
9.200	902.0	902.8	903.6	904.3	905.1	905.9	906.7	907.5	908.2	909.0	909.8	9.200
9.300	909.8	910.6	911.4	912.2	912.9	913.7	914.5	915.3	916.1	916.8	917.6	9.300
9.400	917.6	918.4	919.2	920.0	920.7	921.5	922.3	923.1	923.9	924.6	925.4	9.400
9.500	925.4	926.2	927.0	927.8	928.5	929.3	930.1	930.9	931.6	932.4	933.2	9.500
9.600	933.2	934.0	934.8	935.5	936.3	937.1	937.9	938.7	939.4	940.2	941.0	9.600
9.700	941.0	941.8	942.5	943.3	944.1	944.9	945.6	946.4	947.2	948.0	948.8	9.700
9.800	948.8	949.5	950.3	951.1	951.9	952.6	953.4	954.2	954.9	955.7	956.5	9.800
9.900	956.5	957.2	958.0	958.8	959.5	960.3	961.0	961.8	962.6	963.4	964.1	9.900
10.000	964.1	964.9	965.6	966.4	967.2	967.9	968.7	969.5	970.2	971.0	971.8	10.000
10.100	971.8	972.5	973.3	974.0	974.8	975.6	976.3	977.1	977.9	978.6	979.4	10.100
10.200	979.4	980.2	980.9	981.7	982.4	983.2	984.0	984.7	985.5	986.3	987.0	10.200
10.300	987.0	987.8	988.5	989.3	990.1	990.8	991.6	992.3	993.1	993.9	994.6	10.300
10.400	994.6	995.4	996.1	996.9	997.7	998.4	999.2	999.9	1000.7	1001.5	1002.2	10.400
10.500	1002.2	1003.0	1003.7	1004.5	1005.3	1006.0	1006.8	1007.5	1008.3	1009.1	1009.8	10.500
10.600	1009.8	1010.6	1011.3	1012.1	1012.8	1013.6	1014.4	1015.1	1015.9	1016.6	1017.4	10.600
10.700	1017.4	1018.1	1018.9	1019.6	1020.4	1021.1	1021.9	1022.6	1023.4	1024.1	1024.9	10.700
10.800	1024.9	1025.6	1026.4	1027.1	1027.9	1028.6	1029.4	1030.1	1030.8	1031.6	1032.3	10.800
10.900	1032.3	1033.1	1033.8	1034.6	1035.3	1036.1	1036.8	1037.6	1038.3	1039.1	1039.8	10.900
11.000	1039.8	1040.6	1041.3	1042.0	1042.8	1043.5	1044.2	1045.0	1045.7	1046.4	1047.2	11.000
11.100	1047.2	1047.9	1048.7	1049.4	1050.2	1050.9	1051.6	1052.4	1053.1	1053.9	1054.6	11.100
11.200	1054.6	1055.4	1056.1	1056.8	1057.6	1058.3	1059.1	1059.8	1060.5	1061.3	1062.0	11.200
11.300	1062.0	1062.8	1063.5	1064.2	1065.0	1065.7	1066.4	1067.2	1067.9	1068.7	1069.4	11.300
11.400	1069.4	1070.1	1070.9	1071.6	1072.3	1073.1	1073.8	1074.5	1075.3	1076.0	1076.7	11.400
11.500	1076.7	1077.5	1078.2	1078.9	1079.7	1080.4	1081.1	1081.9	1082.6	1083.3	1084.1	11.500
11.600	1084.1	1084.8	1085.5	1086.3	1087.0	1087.7	1088.5	1089.2	1089.9	1090.7	1091.4	11.600
11.700	1091.4	1092.1	1092.9	1093.6	1094.3	1095.1	1095.8	1096.5	1097.3	1098.0	1098.7	11.700
11.800	1098.7	1099.5	1100.2	1101.0	1101.7	1102.4	1103.2	1103.9	1104.6	1105.4	1106.1	11.800
11.900	1106.1	1106.8	1107.6	1108.3	1109.0	1109.7	1110.5	1111.2	1111.9	1112.7	1113.4	11.900
12.000	1113.4	1114.1	1114.9	1115.6	1116.3	1117.1	1117.8	1118.5	1119.2	1120.0	1120.7	12.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

**Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
12.000	1113.4	1114.1	1114.9	1115.6	1116.3	1117.1	1117.8	1118.5	1119.2	1120.0	1120.7	12.000
12.100	1120.7	1121.4	1122.2	1122.9	1123.6	1124.4	1125.1	1125.8	1126.5	1127.3	1128.0	12.100
12.200	1128.0	1128.7	1129.5	1130.2	1130.9	1131.7	1132.4	1133.1	1133.8	1134.6	1135.3	12.200
12.300	1135.3	1136.0	1136.8	1137.5	1138.2	1138.9	1139.7	1140.4	1141.1	1141.9	1142.6	12.300
12.400	1142.6	1143.3	1144.0	1144.8	1145.5	1146.2	1146.9	1147.6	1148.4	1149.1	1149.8	12.400
12.500	1149.8	1150.5	1151.3	1152.0	1152.7	1153.4	1154.2	1154.9	1155.6	1156.4	1157.1	12.500
12.600	1157.1	1157.8	1158.5	1159.3	1160.0	1160.7	1161.4	1162.2	1162.9	1163.6	1164.3	12.600
12.700	1164.3	1165.0	1165.8	1166.5	1167.2	1167.9	1168.7	1169.4	1170.1	1170.8	1171.5	12.700
12.800	1171.5	1172.3	1173.0	1173.7	1174.4	1175.2	1175.9	1176.6	1177.3	1178.1	1178.8	12.800
12.900	1178.8	1179.5	1180.2	1180.9	1181.7	1182.4	1183.1	1183.8	1184.6	1185.3	1186.0	12.900
13.000	1186.0	1186.7	1187.5	1188.2	1188.9	1189.6	1190.3	1191.1	1191.8	1192.5	1193.2	13.000
13.100	1193.2	1194.0	1194.7	1195.4	1196.1	1196.9	1197.6	1198.3	1199.0	1199.7	1200.5	13.100
13.200	1200.5	1201.2	1201.9	1202.6	1203.3	1204.1	1204.8	1205.5	1206.2	1207.0	1207.7	13.200
13.300	1207.7	1208.4	1209.1	1209.8	1210.6	1211.3	1212.0	1212.7	1213.4	1214.2	1214.9	13.300
13.400	1214.9	1215.6	1216.3	1217.1	1217.8	1218.5	1219.2	1219.9	1220.7	1221.4	1222.1	13.400
13.500	1222.1	1222.8	1223.5	1224.3	1225.0	1225.7	1226.4	1227.1	1227.9	1228.6	1229.3	13.500
13.600	1229.3	1230.0	1230.7	1231.5	1232.2	1232.9	1233.6	1234.3	1235.1	1235.8	1236.5	13.600
13.700	1236.5	1237.2	1237.9	1238.6	1239.4	1240.1	1240.8	1241.5	1242.2	1243.0	1243.7	13.700
13.800	1243.7	1244.4	1245.1	1245.8	1246.6	1247.3	1248.0	1248.7	1249.4	1250.2	1250.9	13.800
13.900	1250.9	1251.6	1252.3	1253.0	1253.8	1254.5	1255.2	1255.9	1256.6	1257.4	1258.1	13.900
14.000	1258.1	1258.7	1259.5	1260.2	1261.0	1261.7	1262.4	1263.1	1263.8	1264.6	1265.3	14.000
14.100	1265.3	1266.0	1266.7	1267.4	1268.2	1268.9	1269.6	1270.3	1271.1	1271.8	1272.5	14.100
14.200	1272.5	1273.2	1273.9	1274.6	1275.4	1276.1	1276.8	1277.5	1278.3	1279.0	1279.7	14.200
14.300	1279.7	1280.4	1281.1	1281.8	1282.6	1283.3	1284.0	1284.7	1285.5	1286.2	1286.9	14.300
14.400	1286.9	1287.6	1288.3	1289.0	1289.7	1290.5	1291.2	1291.9	1292.6	1293.3	1294.1	14.400
14.500	1294.1	1294.8	1295.5	1296.2	1296.9	1297.7	1298.4	1299.1	1299.8	1300.5	1301.3	14.500
14.600	1301.3	1302.0	1302.7	1303.4	1304.1	1304.8	1305.6	1306.3	1307.0	1307.7	1308.5	14.600
14.700	1308.5	1309.2	1309.9	1310.6	1311.3	1312.1	1312.8	1313.5	1314.2	1314.9	1315.7	14.700
14.800	1315.7	1316.4	1317.1	1317.8	1318.5	1319.3	1320.0	1320.7	1321.4	1322.1	1322.9	14.800
14.900	1322.9	1323.6	1324.3	1325.0	1325.8	1326.5	1327.2	1327.9	1328.6	1329.4	1330.1	14.900
15.000	1330.1	1330.8	1331.5	1332.3	1333.0	1333.7	1334.4	1335.1	1335.9	1336.6	1337.3	15.000
15.100	1337.3	1338.0	1338.7	1339.5	1340.2	1340.9	1341.6	1342.3	1343.1	1343.8	1344.5	15.100
15.200	1344.5	1345.2	1345.9	1346.7	1347.4	1348.1	1348.8	1349.6	1350.3	1351.0	1351.7	15.200
15.300	1351.7	1352.4	1353.2	1353.9	1354.6	1355.3	1356.0	1356.8	1357.5	1358.2	1358.9	15.300
15.400	1358.9	1359.7	1360.4	1361.1	1361.8	1362.5	1363.3	1364.0	1364.7	1365.4	1366.1	15.400
15.500	1366.1	1366.9	1367.6	1368.3	1369.0	1369.7	1370.5	1371.2	1371.9	1372.6	1373.4	15.500
15.600	1373.4	1374.1	1374.8	1375.5	1376.2	1377.0	1377.7	1378.4	1379.1	1379.8	1380.6	15.600
15.700	1380.6	1381.3	1382.0	1382.7	1383.4	1384.2	1384.9	1385.6	1386.3	1387.1	1387.8	15.700
15.800	1387.8	1388.5	1389.2	1389.9	1390.7	1391.4	1392.1	1392.8	1393.5	1394.3	1395.0	15.800
15.900	1395.0	1395.7	1396.4	1397.2	1397.9	1398.6	1399.3	1400.1	1400.8	1401.5	1402.2	15.900
16.000	1402.2	1402.9	1403.6	1404.4	1405.1	1405.8	1406.5	1407.3	1408.0	1408.7	1409.4	16.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

**Table 3. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.****(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees C												
16.000	1402.2	1402.9	1403.6	1404.4	1405.1	1405.8	1406.5	1407.3	1408.0	1408.7	1409.4	16.000
16.100	1409.4	1410.1	1410.8	1411.6	1412.3	1413.0	1413.7	1414.5	1415.2	1415.9	1416.6	16.100
16.200	1416.6	1417.3	1418.1	1418.8	1419.5	1420.2	1420.9	1421.7	1422.4	1423.1	1423.8	16.200
16.300	1423.8	1424.5	1425.3	1426.0	1426.7	1427.4	1428.1	1428.9	1429.6	1430.3	1431.0	16.300
16.400	1431.0	1431.7	1432.5	1433.2	1433.9	1434.6	1435.4	1436.1	1436.8	1437.5	1438.2	16.400
16.500	1438.2	1438.9	1439.7	1440.4	1441.1	1441.8	1442.6	1443.3	1444.0	1444.7	1445.4	16.500
16.600	1445.4	1446.2	1446.9	1447.6	1448.3	1449.0	1449.8	1450.5	1451.2	1451.9	1452.6	16.600
16.700	1452.6	1453.4	1454.1	1454.8	1455.5	1456.3	1457.0	1457.7	1458.4	1459.1	1459.8	16.700
16.800	1459.8	1460.6	1461.3	1462.0	1462.7	1463.5	1464.2	1464.9	1465.6	1466.3	1467.0	16.800
16.900	1467.0	1467.8	1468.5	1469.2	1470.0	1470.7	1471.4	1472.1	1472.9	1473.6	1474.3	16.900
17.000	1474.3	1475.0	1475.7	1476.5	1477.2	1477.9	1478.6	1479.4	1480.1	1480.8	1481.6	17.000
17.100	1481.6	1482.3	1483.0	1483.7	1484.4	1485.2	1485.9	1486.6	1487.4	1488.1	1488.8	17.100
17.200	1488.8	1489.5	1490.3	1491.0	1491.7	1492.4	1493.2	1493.9	1494.6	1495.4	1496.1	17.200
17.300	1496.1	1496.8	1497.5	1498.3	1499.0	1499.7	1500.4	1501.2	1501.9	1502.6	1503.3	17.300
17.400	1503.3	1504.0	1504.8	1505.5	1506.2	1507.0	1507.7	1508.4	1509.2	1509.9	1510.6	17.400
17.500	1510.6	1511.3	1512.1	1512.8	1513.5	1514.2	1514.9	1515.7	1516.4	1517.1	1517.8	17.500
17.600	1517.8	1518.6	1519.3	1520.0	1520.7	1521.5	1522.2	1522.9	1523.6	1524.4	1525.1	17.600
17.700	1525.1	1525.8	1526.5	1527.3	1528.0	1528.7	1529.4	1530.2	1530.9	1531.6	1532.3	17.700
17.800	1532.3	1533.1	1533.8	1534.5	1535.2	1536.0	1536.7	1537.4	1538.1	1538.9	1539.6	17.800
17.900	1539.6	1540.3	1541.1	1541.8	1542.5	1543.2	1544.0	1544.7	1545.4	1546.2	1546.9	17.900
18.000	1546.9	1547.6	1548.3	1549.1	1549.8	1550.5	1551.3	1552.0	1552.7	1553.5	1554.2	18.000
18.100	1554.2	1554.9	1555.6	1556.4	1557.1	1557.8	1558.6	1559.3	1560.1	1560.8	1561.5	18.100
18.200	1561.5	1562.2	1563.0	1563.7	1564.4	1565.1	1565.9	1566.6	1567.3	1568.1	1568.8	18.200
18.300	1568.8	1569.5	1570.3	1571.0	1571.7	1572.5	1573.2	1573.9	1574.6	1575.4	1576.1	18.300
18.400	1576.1	1576.8	1577.6	1578.3	1579.0	1579.8	1580.5	1581.2	1581.9	1582.7	1583.4	18.400
18.500	1583.4	1584.1	1584.9	1585.6	1586.3	1587.1	1587.8	1588.5	1589.3	1590.0	1590.7	18.500
18.600	1590.7	1591.4	1592.2	1592.9	1593.6	1594.4	1595.1	1595.8	1596.6	1597.3	1598.0	18.600
18.700	1598.0	1598.7	1599.5	1600.2	1600.9	1601.7	1602.4	1603.1	1603.9	1604.6	1605.3	18.700
18.800	1605.3	1606.0	1606.8	1607.5	1608.3	1609.0	1609.7	1610.4	1611.2	1611.9	1612.6	18.800
18.900	1612.6	1613.4	1614.1	1614.8	1615.6	1616.3	1617.0	1617.8	1618.5	1619.2	1619.9	18.900
19.000	1619.9	1620.7	1621.4	1622.1	1622.9	1623.6	1624.3	1625.1	1625.8	1626.5	1627.3	19.000
19.100	1627.3	1628.0	1628.7	1629.5	1630.2	1631.0	1631.7	1632.4	1633.1	1633.9	1634.6	19.100
19.200	1634.6	1635.4	1636.1	1636.8	1637.6	1638.3	1639.0	1639.8	1640.5	1641.2	1642.0	19.200
19.300	1642.0	1642.7	1643.4	1644.2	1644.9	1645.6	1646.4	1647.1	1647.8	1648.6	1649.3	19.300
19.400	1649.3	1650.1	1650.8	1651.5	1652.2	1653.0	1653.7	1654.5	1655.2	1655.9	1656.7	19.400
19.500	1656.7	1657.4	1658.1	1658.9	1659.6	1660.4	1661.1	1661.8	1662.5	1663.3	1664.0	19.500
19.600	1664.0	1664.7	1665.5	1666.2	1666.9	1667.7	1668.4	1669.1	1669.9	1670.6	1671.3	19.600
19.700	1671.3	1672.1	1672.8	1673.6	1674.3	1675.0	1675.8	1676.5	1677.2	1678.0	1678.7	19.700
19.800	1678.7	1679.4	1680.2	1680.9	1681.6	1682.4	1683.1	1683.8	1684.6	1685.3	1686.0	19.800
19.900	1686.0	1686.8	1687.5	1688.3	1689.0	1689.7	1690.5	1691.2	1691.9	1692.7	1693.4	19.900
20.000	1693.4	1694.1	1694.9	1695.6	1696.4	1697.1	1697.8	1698.6	1699.3	1700.0	1700.8	20.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

# Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	1	2	3	4	5	6	7	8	9	10	° C
Millivolts												
0	0.000	0.005	0.011	0.016	0.022	0.027	0.033	0.038	0.043	0.049	0.055	0
10	.055	.061	.066	.072	.078	.083	.089	.095	.101	.106	.112	10
20	.112	.118	.124	.130	.136	.142	.148	.154	.160	.166	.172	20
30	.172	.178	.184	.190	.196	.203	.209	.215	.221	.228	.234	30
40	.234	.240	.246	.252	.259	.265	.272	.278	.285	.291	.298	40
50	.298	.304	.311	.317	.324	.330	.337	.343	.350	.357	.363	50
60	.363	.370	.377	.383	.390	.397	.403	.410	.417	.424	.431	60
70	.431	.438	.445	.451	.458	.465	.472	.479	.486	.493	.500	70
80	.500	.507	.514	.521	.528	.536	.543	.550	.557	.565	.572	80
90	.572	.579	.586	.594	.601	.609	.616	.623	.631	.638	.645	90
100	.645	.653	.660	.668	.675	.683	.690	.698	.705	.713	.721	100
110	.721	.728	.736	.744	.752	.759	.767	.775	.782	.790	.798	110
120	.798	.805	.813	.821	.829	.837	.845	.853	.861	.869	.877	120
130	.877	.885	.893	.901	.909	.917	.925	.933	.941	.949	.957	130
140	.957	.966	.974	.982	.990	.998	1.006	1.014	1.022	1.031	1.039	140
150	1.039	1.047	1.055	1.063	1.072	1.080	1.088	1.096	1.104	1.112	1.121	150
160	1.121	1.129	1.138	1.146	1.154	1.163	1.171	1.179	1.188	1.196	1.205	160
170	1.205	1.213	1.222	1.231	1.239	1.247	1.256	1.265	1.273	1.282	1.290	170
180	1.290	1.298	1.307	1.316	1.324	1.333	1.342	1.351	1.359	1.368	1.377	180
190	1.377	1.386	1.395	1.403	1.412	1.420	1.429	1.438	1.447	1.456	1.465	190
200	1.465	1.473	1.482	1.491	1.500	1.509	1.517	1.526	1.535	1.544	1.553	200
210	1.553	1.562	1.571	1.580	1.589	1.598	1.607	1.616	1.625	1.634	1.643	210
220	1.643	1.652	1.661	1.670	1.679	1.688	1.697	1.706	1.715	1.725	1.734	220
230	1.734	1.743	1.752	1.761	1.770	1.779	1.788	1.798	1.807	1.816	1.826	230
240	1.826	1.835	1.844	1.853	1.863	1.872	1.881	1.890	1.900	1.909	1.918	240
250	1.918	1.928	1.937	1.946	1.956	1.965	1.974	1.984	1.993	2.002	2.012	250
260	2.012	2.021	2.031	2.040	2.050	2.059	2.068	2.078	2.087	2.097	2.107	260
270	2.107	2.116	2.126	2.135	2.145	2.154	2.164	2.173	2.183	2.192	2.202	270
280	2.202	2.211	2.221	2.231	2.240	2.250	2.259	2.269	2.279	2.288	2.298	280
290	2.298	2.308	2.317	2.327	2.337	2.346	2.356	2.366	2.375	2.385	2.395	290
300	2.395	2.405	2.415	2.424	2.434	2.444	2.454	2.464	2.473	2.483	2.493	300
310	2.493	2.503	2.513	2.522	2.532	2.542	2.552	2.562	2.572	2.581	2.591	310
320	2.591	2.601	2.611	2.621	2.631	2.641	2.650	2.660	2.670	2.680	2.690	320
330	2.690	2.700	2.710	2.720	2.730	2.740	2.750	2.760	2.770	2.780	2.790	330
340	2.790	2.800	2.810	2.820	2.830	2.840	2.850	2.860	2.870	2.880	2.890	340
350	2.890	2.900	2.910	2.920	2.930	2.940	2.950	2.961	2.971	2.981	2.991	350
360	2.991	3.001	3.011	3.021	3.031	3.041	3.051	3.062	3.072	3.082	3.092	360
370	3.092	3.102	3.112	3.122	3.133	3.143	3.153	3.163	3.173	3.183	3.194	370
380	3.194	3.204	3.214	3.224	3.234	3.245	3.255	3.265	3.276	3.286	3.296	380
390	3.296	3.306	3.317	3.327	3.337	3.347	3.358	3.368	3.378	3.389	3.399	390
400	3.399	3.409	3.420	3.430	3.440	3.451	3.461	3.471	3.481	3.492	3.502	400
° C	0	1	2	3	4	5	6	7	8	9	10	° C

**Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.****(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

°C	0	1	2	3	4	5	6	7	8	9	10	°C
Millivolts												
400	3.399	3.409	3.420	3.430	3.440	3.451	3.461	3.471	3.481	3.492	3.502	400
410	3.502	3.512	3.523	3.533	3.544	3.554	3.565	3.575	3.586	3.596	3.607	410
420	3.607	3.617	3.627	3.638	3.648	3.659	3.669	3.680	3.690	3.701	3.712	420
430	3.712	3.722	3.732	3.743	3.753	3.764	3.774	3.785	3.796	3.806	3.817	430
440	3.817	3.827	3.838	3.848	3.859	3.870	3.880	3.891	3.901	3.912	3.923	440
450	3.923	3.933	3.944	3.954	3.965	3.976	3.987	3.997	4.008	4.018	4.029	450
460	4.029	4.039	4.050	4.060	4.071	4.081	4.092	4.102	4.113	4.123	4.134	460
470	4.134	4.145	4.156	4.166	4.177	4.187	4.198	4.209	4.219	4.230	4.241	470
480	4.241	4.251	4.262	4.273	4.283	4.294	4.305	4.315	4.326	4.337	4.348	480
490	4.348	4.358	4.369	4.380	4.390	4.401	4.412	4.422	4.433	4.444	4.455	490
500	4.455	4.466	4.477	4.488	4.498	4.509	4.520	4.531	4.542	4.552	4.563	500
510	4.563	4.574	4.585	4.596	4.607	4.618	4.629	4.640	4.651	4.662	4.672	510
520	4.672	4.683	4.694	4.705	4.716	4.727	4.738	4.749	4.760	4.771	4.782	520
530	4.782	4.793	4.804	4.815	4.826	4.837	4.848	4.859	4.870	4.881	4.893	530
540	4.893	4.904	4.915	4.926	4.937	4.948	4.959	4.970	4.981	4.992	5.004	540
550	5.004	5.015	5.026	5.037	5.048	5.059	5.070	5.081	5.092	5.104	5.115	550
560	5.115	5.126	5.137	5.148	5.159	5.170	5.182	5.193	5.204	5.215	5.226	560
570	5.226	5.238	5.249	5.260	5.271	5.282	5.293	5.304	5.316	5.327	5.338	570
580	5.338	5.349	5.360	5.371	5.383	5.394	5.405	5.416	5.428	5.439	5.450	580
590	5.450	5.461	5.472	5.484	5.495	5.507	5.518	5.529	5.540	5.551	5.563	590
600	5.563	5.574	5.586	5.597	5.609	5.620	5.631	5.642	5.654	5.665	5.677	600
610	5.677	5.688	5.700	5.711	5.723	5.734	5.746	5.757	5.769	5.780	5.792	610
620	5.792	5.803	5.814	5.826	5.837	5.849	5.861	5.872	5.883	5.895	5.907	620
630	5.907	5.918	5.930	5.941	5.952	5.964	5.976	5.987	5.999	6.010	6.022	630
640	6.022	6.033	6.044	6.056	6.068	6.079	6.091	6.102	6.114	6.126	6.137	640
650	6.137	6.149	6.160	6.171	6.183	6.194	6.206	6.218	6.229	6.240	6.252	650
660	6.252	6.264	6.275	6.287	6.299	6.310	6.321	6.333	6.344	6.356	6.368	660
670	6.368	6.380	6.391	6.403	6.415	6.427	6.438	6.450	6.461	6.473	6.485	670
680	6.485	6.497	6.508	6.520	6.532	6.544	6.555	6.567	6.579	6.590	6.602	680
690	6.602	6.614	6.626	6.637	6.649	6.661	6.672	6.684	6.696	6.708	6.720	690
700	6.720	6.732	6.744	6.756	6.768	6.779	6.791	6.803	6.815	6.827	6.838	700
710	6.838	6.850	6.862	6.874	6.886	6.898	6.910	6.922	6.934	6.946	6.957	710
720	6.957	6.969	6.981	6.993	7.005	7.017	7.029	7.040	7.052	7.064	7.076	720
730	7.076	7.088	7.100	7.112	7.124	7.136	7.147	7.159	7.171	7.183	7.195	730
740	7.195	7.207	7.219	7.231	7.243	7.255	7.267	7.279	7.291	7.303	7.315	740
750	7.315	7.327	7.339	7.351	7.364	7.376	7.388	7.400	7.412	7.424	7.436	750
760	7.436	7.448	7.460	7.472	7.485	7.497	7.509	7.521	7.533	7.545	7.557	760
770	7.557	7.570	7.582	7.594	7.606	7.618	7.631	7.643	7.655	7.667	7.679	770
780	7.679	7.692	7.704	7.716	7.728	7.740	7.752	7.765	7.777	7.789	7.801	780
790	7.801	7.814	7.826	7.838	7.850	7.863	7.875	7.888	7.900	7.912	7.924	790
800	7.924	7.936	7.949	7.961	7.973	7.986	7.998	8.010	8.022	8.035	8.047	800
°C	0	1	2	3	4	5	6	7	8	9	10	°C



**Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.****(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

°C	0	1	2	3	4	5	6	7	8	9	10	°C
	Millivolts											
800	7.924	7.936	7.949	7.961	7.973	7.986	7.998	8.010	8.022	8.035	8.047	800
810	8.047	8.059	8.071	8.084	8.096	8.109	8.121	8.134	8.146	8.158	8.170	810
820	8.170	8.182	8.195	8.208	8.220	8.232	8.245	8.257	8.269	8.281	8.294	820
830	8.294	8.306	8.319	8.331	8.343	8.356	8.369	8.381	8.394	8.406	8.419	830
840	8.419	8.431	8.444	8.456	8.469	8.481	8.494	8.506	8.519	8.531	8.544	840
850	8.544	8.556	8.569	8.581	8.594	8.606	8.619	8.631	8.644	8.656	8.669	850
860	8.669	8.681	8.694	8.706	8.719	8.732	8.744	8.757	8.769	8.782	8.795	860
870	8.795	8.807	8.820	8.832	8.845	8.858	8.870	8.883	8.895	8.908	8.921	870
880	8.921	8.933	8.946	8.959	8.971	8.984	8.996	9.009	9.021	9.034	9.047	880
890	9.047	9.060	9.072	9.085	9.098	9.111	9.123	9.136	9.149	9.161	9.175	890
900	9.175	9.188	9.200	9.213	9.226	9.239	9.251	9.264	9.277	9.290	9.303	900
910	9.303	9.316	9.328	9.341	9.354	9.367	9.379	9.392	9.405	9.418	9.431	910
920	9.431	9.444	9.456	9.469	9.482	9.495	9.508	9.520	9.533	9.546	9.559	920
930	9.559	9.572	9.585	9.598	9.610	9.623	9.636	9.649	9.661	9.674	9.687	930
940	9.687	9.700	9.713	9.726	9.739	9.752	9.765	9.778	9.790	9.803	9.816	940
950	9.816	9.829	9.842	9.855	9.868	9.881	9.894	9.907	9.920	9.933	9.946	950
960	9.946	9.960	9.973	9.986	9.999	10.012	10.025	10.038	10.051	10.064	10.077	960
970	10.077	10.090	10.103	10.116	10.130	10.143	10.156	10.169	10.182	10.195	10.208	970
980	10.208	10.221	10.234	10.247	10.260	10.274	10.287	10.300	10.313	10.326	10.339	980
990	10.339	10.352	10.366	10.379	10.392	10.405	10.419	10.432	10.445	10.458	10.471	990
1,000	10.471	10.484	10.497	10.510	10.523	10.537	10.550	10.563	10.576	10.589	10.603	1,000
1,010	10.603	10.616	10.629	10.642	10.655	10.669	10.682	10.695	10.709	10.722	10.735	1,010
1,020	10.735	10.748	10.761	10.775	10.788	10.801	10.815	10.828	10.841	10.855	10.869	1,020
1,030	10.869	10.882	10.895	10.909	10.922	10.936	10.949	10.963	10.976	10.989	11.003	1,030
1,040	11.003	11.016	11.030	11.043	11.057	11.070	11.084	11.097	11.111	11.124	11.138	1,040
1,050	11.138	11.151	11.165	11.178	11.191	11.205	11.219	11.232	11.246	11.259	11.273	1,050
1,060	11.273	11.286	11.300	11.313	11.327	11.340	11.354	11.367	11.381	11.394	11.408	1,060
1,070	11.408	11.421	11.435	11.449	11.463	11.476	11.490	11.504	11.517	11.531	11.544	1,070
1,080	11.544	11.558	11.571	11.585	11.599	11.613	11.626	11.640	11.654	11.667	11.681	1,080
1,090	11.681	11.694	11.708	11.722	11.736	11.749	11.763	11.776	11.790	11.803	11.817	1,090
1,100	11.817	11.830	11.844	11.858	11.871	11.885	11.899	11.913	11.926	11.940	11.954	1,100
1,110	11.954	11.967	11.981	11.994	12.008	12.022	12.035	12.049	12.063	12.077	12.090	1,110
1,120	12.090	12.104	12.118	12.131	12.145	12.159	12.173	12.186	12.200	12.214	12.227	1,120
1,130	12.227	12.241	12.254	12.268	12.282	12.296	12.310	12.323	12.337	12.351	12.365	1,130
1,140	12.365	12.378	12.392	12.406	12.420	12.434	12.447	12.461	12.475	12.489	12.503	1,140
1,150	12.503	12.516	12.530	12.544	12.558	12.572	12.585	12.599	12.613	12.627	12.641	1,150
1,160	12.641	12.654	12.668	12.682	12.696	12.710	12.723	12.737	12.751	12.765	12.779	1,160
1,170	12.779	12.792	12.806	12.820	12.834	12.848	12.861	12.875	12.889	12.903	12.917	1,170
1,180	12.917	12.931	12.944	12.958	12.972	12.986	13.000	13.014	13.028	13.042	13.055	1,180
1,190	13.055	13.069	13.083	13.097	13.111	13.125	13.139	13.152	13.166	13.180	13.193	1,190
1,200	13.193	13.207	13.221	13.235	13.249	13.263	13.277	13.291	13.305	13.319	13.333	1,200
°C	0	1	2	3	4	5	6	7	8	9	10	°C

**Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.****Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

°C	0	1	2	3	4	5	6	7	8	9	10	°C
Millivolts												
<b>1, 200</b>	13. 193	13. 207	13. 221	13. 235	13. 249	13. 263	13. 277	13. 291	13. 305	13. 319	13. 332	<b>1, 200</b>
<b>1, 210</b>	13. 332	13. 346	13. 360	13. 374	13. 388	13. 402	13. 416	13. 429	13. 443	13. 457	13. 471	<b>1, 210</b>
<b>1, 220</b>	13. 471	13. 485	13. 499	13. 513	13. 526	13. 540	13. 554	13. 568	13. 582	13. 596	13. 610	<b>1, 220</b>
<b>1, 230</b>	13. 610	13. 624	13. 638	13. 652	13. 666	13. 679	13. 693	13. 707	13. 721	13. 735	13. 749	<b>1, 230</b>
<b>1, 240</b>	13. 749	13. 763	13. 777	13. 791	13. 805	13. 818	13. 832	13. 846	13. 860	13. 874	13. 888	<b>1, 240</b>
<b>1, 250</b>	13. 888	13. 902	13. 916	13. 930	13. 943	13. 957	13. 971	13. 985	13. 999	14. 013	14. 027	<b>1, 250</b>
<b>1, 260</b>	14. 027	14. 041	14. 055	14. 069	14. 082	14. 096	14. 110	14. 124	14. 138	14. 152	14. 165	<b>1, 260</b>
<b>1, 270</b>	14. 165	14. 179	14. 193	14. 207	14. 221	14. 235	14. 249	14. 263	14. 277	14. 291	14. 304	<b>1, 270</b>
<b>1, 280</b>	14. 304	14. 318	14. 332	14. 346	14. 360	14. 374	14. 388	14. 402	14. 416	14. 430	14. 443	<b>1, 280</b>
<b>1, 290</b>	14. 443	14. 457	14. 471	14. 485	14. 499	14. 513	14. 527	14. 541	14. 555	14. 569	14. 582	<b>1, 290</b>
<b>1, 300</b>	14. 582	14. 596	14. 610	14. 624	14. 638	14. 652	14. 666	14. 680	14. 694	14. 707	14. 721	<b>1, 300</b>
<b>1, 310</b>	14. 721	14. 735	14. 749	14. 763	14. 777	14. 791	14. 804	14. 818	14. 832	14. 846	14. 860	<b>1, 310</b>
<b>1, 320</b>	14. 860	14. 874	14. 888	14. 901	14. 915	14. 929	14. 943	14. 957	14. 971	14. 985	14. 999	<b>1, 320</b>
<b>1, 330</b>	14. 999	15. 013	15. 026	15. 040	15. 054	15. 068	15. 082	15. 096	15. 110	15. 124	15. 138	<b>1, 330</b>
<b>1, 340</b>	15. 138	15. 151	15. 165	15. 179	15. 193	15. 207	15. 221	15. 234	15. 248	15. 262	15. 276	<b>1, 340</b>
<b>1, 350</b>	15. 276	15. 290	15. 304	15. 318	15. 331	15. 345	15. 359	15. 373	15. 387	15. 401	15. 415	<b>1, 350</b>
<b>1, 360</b>	15. 415	15. 429	15. 443	15. 456	15. 470	15. 484	15. 498	15. 512	15. 526	15. 540	15. 553	<b>1, 360</b>
<b>1, 370</b>	15. 553	15. 567	15. 581	15. 595	15. 609	15. 623	15. 637	15. 651	15. 665	15. 679	15. 692	<b>1, 370</b>
<b>1, 380</b>	15. 692	15. 706	15. 720	15. 734	15. 748	15. 761	15. 775	15. 789	15. 803	15. 817	15. 831	<b>1, 380</b>
<b>1, 390</b>	15. 831	15. 845	15. 859	15. 873	15. 886	15. 900	15. 914	15. 928	15. 942	15. 956	15. 969	<b>1, 390</b>
<b>1, 400</b>	15. 969	15. 983	15. 997	16. 011	16. 025	16. 039	16. 053	16. 067	16. 081	16. 095	16. 108	<b>1, 400</b>
<b>1, 410</b>	16. 108	16. 122	16. 136	16. 150	16. 164	16. 178	16. 192	16. 206	16. 219	16. 233	16. 247	<b>1, 410</b>
<b>1, 420</b>	16. 247	16. 261	16. 275	16. 289	16. 303	16. 317	16. 330	16. 344	16. 358	16. 372	16. 386	<b>1, 420</b>
<b>1, 430</b>	16. 386	16. 400	16. 414	16. 427	16. 441	16. 455	16. 469	16. 483	16. 497	16. 511	16. 524	<b>1, 430</b>
<b>1, 440</b>	16. 524	16. 538	16. 552	16. 566	16. 580	16. 594	16. 608	16. 621	16. 635	16. 649	16. 663	<b>1, 440</b>
<b>1, 450</b>	16. 663	16. 677	16. 691	16. 705	16. 719	16. 733	16. 746	16. 760	16. 774	16. 788	16. 802	<b>1, 450</b>
<b>1, 460</b>	16. 802	16. 816	16. 830	16. 844	16. 858	16. 872	16. 885	16. 899	16. 913	16. 927	16. 940	<b>1, 460</b>
<b>1, 470</b>	16. 940	16. 954	16. 968	16. 982	16. 996	17. 010	17. 024	17. 037	17. 051	17. 065	17. 079	<b>1, 470</b>
<b>1, 480</b>	17. 079	17. 092	17. 106	17. 120	17. 134	17. 148	17. 161	17. 175	17. 189	17. 203	17. 217	<b>1, 480</b>
<b>1, 490</b>	17. 217	17. 230	17. 244	17. 258	17. 272	17. 286	17. 299	17. 313	17. 327	17. 341	17. 355	<b>1, 490</b>
<b>1, 500</b>	17. 355	17. 368	17. 382	17. 396	17. 410	17. 424	17. 437	17. 451	17. 465	17. 479	17. 493	<b>1, 500</b>
<b>1, 510</b>	17. 493	17. 506	17. 520	17. 534	17. 547	17. 561	17. 575	17. 589	17. 603	17. 617	17. 631	<b>1, 510</b>
<b>1, 520</b>	17. 631	17. 644	17. 658	17. 672	17. 686	17. 699	17. 713	17. 726	17. 740	17. 754	17. 768	<b>1, 520</b>
<b>1, 530</b>	17. 768	17. 781	17. 795	17. 809	17. 823	17. 837	17. 850	17. 864	17. 878	17. 892	17. 906	<b>1, 530</b>
<b>1, 540</b>	17. 906	17. 919	17. 933	17. 947	17. 960	17. 974	17. 988	18. 002	18. 016	18. 029	18. 043	<b>1, 540</b>
<b>1, 550</b>	18. 043	18. 056	18. 070	18. 084	18. 098	18. 111	18. 125	18. 139	18. 152	18. 166	18. 179	<b>1, 550</b>
<b>1, 560</b>	18. 179	18. 193	18. 207	18. 220	18. 234	18. 248	18. 261	18. 275	18. 289	18. 303	18. 316	<b>1, 560</b>
<b>1, 570</b>	18. 316	18. 330	18. 344	18. 357	18. 371	18. 385	18. 399	18. 412	18. 426	18. 440	18. 453	<b>1, 570</b>
<b>1, 580</b>	18. 453	18. 467	18. 481	18. 494	18. 508	18. 522	18. 536	18. 549	18. 563	18. 576	18. 590	<b>1, 580</b>
<b>1, 590</b>	18. 590	18. 604	18. 618	18. 631	18. 645	18. 659	18. 672	18. 686	18. 700	18. 714	18. 727	<b>1, 590</b>
<b>1, 600</b>	18. 727	18. 741	18. 754	18. 768	18. 782	18. 796	18. 810	18. 823	18. 836	18. 850	18. 864	<b>1, 600</b>
°C	0	1	2	3	4	5	6	7	8	9	10	°C

**Table 4. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.****(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)**

°C	0	1	2	3	4	5	6	7	8	9	10	°C
	Millivolts											
<b>1, 600</b>	18. 727	18. 741	18. 754	18. 768	18. 782	18. 796	18. 810	18. 823	18. 836	18. 850	18. 864	<b>1, 600</b>
<b>1, 610</b>	18. 864	18. 878	18. 891	18. 905	18. 919	18. 932	18. 946	18. 960	18. 973	18. 987	19. 001	<b>1, 610</b>
<b>1, 620</b>	19. 001	19. 014	19. 028	19. 042	19. 056	19. 069	19. 083	19. 096	19. 110	19. 124	19. 137	<b>1, 620</b>
<b>1, 630</b>	19. 137	19. 150	19. 164	19. 178	19. 191	19. 205	19. 219	19. 232	19. 246	19. 260	19. 273	<b>1, 630</b>
<b>1, 640</b>	19. 273	19. 287	19. 300	19. 314	19. 328	19. 341	19. 355	19. 369	19. 382	19. 396	19. 409	<b>1, 640</b>
<b>1, 650</b>	19. 409	19. 423	19. 437	19. 450	19. 464	19. 477	19. 491	19. 504	19. 518	19. 531	19. 545	<b>1, 650</b>
<b>1, 660</b>	19. 545	19. 559	19. 573	19. 586	19. 600	19. 614	19. 627	19. 641	19. 654	19. 668	19. 682	<b>1, 660</b>
<b>1, 670</b>	19. 682	19. 695	19. 709	19. 722	19. 736	19. 750	19. 763	19. 777	19. 790	19. 804	19. 818	<b>1, 670</b>
<b>1, 680</b>	19. 818	19. 831	19. 845	19. 859	19. 873	19. 886	19. 900	19. 913	19. 927	19. 940	19. 954	<b>1, 680</b>
<b>1, 690</b>	19. 954	19. 967	19. 981	19. 994	20. 008	20. 022	20. 035	20. 049	20. 062	20. 076	20. 090	<b>1, 690</b>
°C	0	1	2	3	4	5	6	7	8	9	10	°C

# Table 5. Chromel-Alumel Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts
Degrees C												
-5.00	-158	-163	-168	-173	-178	-184	-190	-195	-200	-205	-210	-5.00
-4.00	-118	-122	-125	-129	-133	-137	-141	-145	-149	-154	-158	-4.00
-3.00	-84	-87	-90	-94	-97	-100	-104	-107	-111	-114	-118	-3.00
-2.00	-54	-57	-60	-63	-66	-69	-72	-75	-78	-81	-84	-2.00
-1.00	-26	-29	-32	-34	-37	-40	-43	-46	-48	-51	-54	-1.00
(-)0.00	0	-3	-5	-8	-10	-13	-16	-18	-21	-24	-26	(-)0.00
(+)0.00	0	3	5	8	10	13	15	18	20	23	25	(+)0.00
1.00	25	28	30	32	35	37	40	42	45	47	49	1.00
2.00	49	52	54	57	59	62	64	67	69	71	74	2.00
3.00	74	76	78	81	83	86	88	91	93	95	98	3.00
4.00	98	100	102	105	107	110	112	114	117	119	122	4.00
5.00	122	124	127	129	132	134	137	139	142	144	147	5.00
6.00	147	149	152	154	157	159	162	164	167	169	172	6.00
7.00	172	174	177	179	182	184	187	189	192	194	197	7.00
8.00	197	199	202	204	207	209	212	214	217	219	222	8.00
9.00	222	224	227	229	232	234	236	239	241	244	246	9.00
10.00	246	249	251	253	256	258	261	263	266	268	271	10.00
11.00	271	273	276	278	280	283	285	288	290	292	295	11.00
12.00	295	297	300	302	304	307	309	312	314	317	319	12.00
13.00	319	321	324	326	329	331	333	336	338	341	343	13.00
14.00	343	345	348	350	353	355	357	360	362	364	367	14.00
15.00	367	369	372	374	376	379	381	383	386	388	391	15.00
16.00	391	393	395	398	400	402	405	407	409	412	414	16.00
17.00	414	417	419	421	424	426	428	431	433	436	438	17.00
18.00	438	440	443	445	447	450	452	454	457	459	461	18.00
19.00	461	464	466	468	471	473	476	478	480	483	485	19.00
20.00	485	487	489	492	494	497	499	501	504	506	508	20.00
21.00	508	511	513	516	518	520	522	525	527	529	532	21.00
22.00	532	534	537	539	541	543	546	548	551	553	555	22.00
23.00	555	558	560	562	564	567	569	572	574	576	579	23.00
24.00	579	581	583	586	588	590	593	595	597	600	602	24.00
25.00	602	604	607	609	612	614	616	618	621	623	626	25.00
26.00	626	628	630	633	635	637	640	642	644	647	649	26.00
27.00	649	652	654	656	659	661	663	666	668	671	673	27.00
28.00	673	675	678	680	682	685	687	689	692	694	697	28.00
29.00	697	699	702	704	706	709	711	713	716	718	721	29.00
30.00	721	723	725	728	730	733	735	737	740	742	744	30.00
Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts

**Table 5. Chromel-Alumel Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts
	Degrees C											
30.00	721	723	725	728	730	733	735	737	740	742	744	30.00
31.00	744	747	749	752	754	757	759	761	764	766	768	31.00
32.00	768	771	773	776	778	781	783	786	788	790	793	32.00
33.00	793	795	798	800	802	805	807	810	812	815	817	33.00
34.00	817	819	822	824	827	829	832	834	837	839	842	34.00
35.00	842	844	847	849	852	854	856	859	861	864	866	35.00
36.00	866	869	871	874	876	879	881	884	886	889	891	36.00
37.00	891	894	896	899	901	904	906	908	911	913	916	37.00
38.00	916	918	921	923	926	928	931	933	936	938	941	38.00
39.00	941	944	946	949	951	954	956	959	961	964	967	39.00
40.00	967	969	972	974	977	979	982	984	987	989	992	40.00
41.00	992	994	997	1,000	1,002	1,005	1,007	1,010	1,012	1,015	1,018	41.00
42.00	1,018	1,020	1,023	1,025	1,028	1,031	1,033	1,036	1,038	1,041	1,044	42.00
43.00	1,044	1,046	1,049	1,051	1,054	1,057	1,059	1,062	1,064	1,067	1,069	43.00
44.00	1,069	1,072	1,075	1,077	1,080	1,083	1,085	1,088	1,091	1,093	1,096	44.00
45.00	1,096	1,098	1,101	1,104	1,106	1,109	1,112	1,114	1,117	1,119	1,122	45.00
46.00	1,122	1,125	1,128	1,130	1,133	1,136	1,138	1,141	1,143	1,146	1,149	46.00
47.00	1,149	1,152	1,154	1,157	1,160	1,162	1,165	1,168	1,171	1,173	1,176	47.00
48.00	1,176	1,179	1,181	1,184	1,187	1,189	1,192	1,195	1,198	1,200	1,203	48.00
49.00	1,203	1,206	1,208	1,211	1,214	1,217	1,219	1,222	1,225	1,228	1,231	49.00
50.00	1,231	1,233	1,236	1,239	1,242	1,244	1,247	1,250	1,253	1,256	1,258	50.00
51.00	1,258	1,261	1,264	1,267	1,270	1,273	1,276	1,278	1,281	1,284	1,287	51.00
52.00	1,287	1,290	1,293	1,295	1,298	1,301	1,304	1,307	1,310	1,313	1,315	52.00
53.00	1,315	1,318	1,321	1,324	1,327	1,330	1,333	1,336	1,338	1,341	1,344	53.00
54.00	1,344	1,347	1,350	1,353	1,356	1,359	1,362	365	1,368	1,371	1,374	54.00
Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts

# Table 6. Chromel-Alumel Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	1	2	3	4	5	6	7	8	9	10	° C
Millivolts												
-190	-5.60	-5.62	-5.63	-5.65	-5.67	-5.68	-5.70	-5.71	-5.73	-5.74	-5.75	-190
-180	-5.43	-5.45	-5.46	-5.48	-5.50	-5.52	-5.53	-5.55	-5.57	-5.58	-5.60	-180
-170	-5.24	-5.26	-5.28	-5.30	-5.32	-5.34	-5.35	-5.37	-5.39	-5.41	-5.43	-170
-160	-5.03	-5.05	-5.08	-5.10	-5.12	-5.14	-5.16	-5.18	-5.20	-5.22	-5.24	-160
-150	-4.81	-4.84	-4.86	-4.88	-4.90	-4.92	-4.95	-4.97	-4.99	-5.01	-5.03	-150
-140	-4.58	-4.60	-4.62	-4.65	-4.67	-4.70	-4.72	-4.74	-4.77	-4.79	-4.81	-140
-130	-4.32	-4.35	-4.37	-4.40	-4.42	-4.45	-4.48	-4.50	-4.52	-4.55	-4.58	-130
-120	-4.06	-4.08	-4.11	-4.14	-4.16	-4.19	-4.22	-4.24	-4.27	-4.30	-4.32	-120
-110	-3.78	-3.81	-3.84	-3.86	-3.89	-3.92	-3.95	-3.98	-4.00	-4.03	-4.06	-110
-100	-3.49	-3.52	-3.55	-3.58	-3.61	-3.64	-3.66	-3.69	-3.72	-3.75	-3.78	-100
-90	-3.19	-3.22	-3.25	-3.28	-3.31	-3.34	-3.37	-3.40	-3.43	-3.46	-3.49	-90
-80	-2.87	-2.90	-2.93	-2.96	-3.00	-3.03	-3.06	-3.09	-3.12	-3.16	-3.19	-80
-70	-2.54	-2.57	-2.61	-2.64	-2.67	-2.71	-2.74	-2.77	-2.80	-2.84	-2.87	-70
-60	-2.20	-2.24	-2.27	-2.30	-2.34	-2.37	-2.41	-2.44	-2.47	-2.51	-2.54	-60
-50	-1.86	-1.89	-1.93	-1.96	-2.00	-2.03	-2.07	-2.10	-2.13	-2.17	-2.20	-50
-40	-1.50	-1.54	-1.57	-1.61	-1.64	-1.68	-1.72	-1.75	-1.79	-1.82	-1.86	-40
-30	-1.14	-1.17	-1.21	-1.25	-1.28	-1.32	-1.36	-1.39	-1.43	-1.47	-1.50	-30
-20	-0.77	-0.80	-0.84	-0.88	-0.92	-0.95	-0.99	-1.03	-1.06	-1.10	-1.14	-20
-10	-0.39	-0.42	-0.46	-0.50	-0.54	-0.58	-0.62	-0.66	-0.69	-0.73	-0.77	-10
(-)0	-0.00	-0.04	-0.08	-0.12	-0.16	-0.19	-0.23	-0.27	-0.31	-0.35	-0.39	(-)0
(+)0	0.00	0.04	0.08	0.12	0.16	0.20	0.24	0.28	0.32	0.36	0.40	(+)0
10	0.40	0.44	0.48	0.52	0.56	0.60	0.64	0.68	0.72	0.76	0.80	10
20	0.80	0.84	0.88	0.92	0.96	1.00	1.04	1.08	1.12	1.16	1.20	20
30	1.20	1.24	1.28	1.32	1.36	1.40	1.44	1.49	1.53	1.57	1.61	30
40	1.61	1.65	1.69	1.73	1.77	1.81	1.85	1.90	1.94	1.98	2.02	40
50	2.02	2.06	2.10	2.14	2.18	2.23	2.27	2.31	2.35	2.39	2.43	50
60	2.43	2.47	2.51	2.56	2.60	2.64	2.68	2.72	2.76	2.80	2.85	60
70	2.85	2.89	2.93	2.97	3.01	3.05	3.10	3.14	3.18	3.22	3.26	70
80	3.26	3.30	3.35	3.39	3.43	3.47	3.51	3.56	3.60	3.64	3.68	80
90	3.68	3.72	3.76	3.81	3.85	3.89	3.93	3.97	4.01	4.06	4.10	90
100	4.10	4.14	4.18	4.22	4.26	4.31	4.35	4.39	4.43	4.47	4.51	100
110	4.51	4.55	4.60	4.64	4.68	4.72	4.76	4.80	4.84	4.88	4.92	110
120	4.92	4.96	5.01	5.05	5.09	5.13	5.17	5.21	5.25	5.29	5.33	120
130	5.33	5.37	5.41	5.45	5.49	5.53	5.57	5.61	5.65	5.69	5.73	130
140	5.73	5.77	5.81	5.85	5.89	5.93	5.97	6.01	6.05	6.09	6.13	140
150	6.13	6.17	6.21	6.25	6.29	6.33	6.37	6.41	6.45	6.49	6.53	150
160	6.53	6.57	6.61	6.65	6.69	6.73	6.77	6.81	6.85	6.89	6.93	160
170	6.93	6.97	7.01	7.05	7.09	7.13	7.17	7.21	7.25	7.29	7.33	170
180	7.33	7.37	7.41	7.45	7.49	7.53	7.57	7.61	7.65	7.69	7.73	180
190	7.73	7.77	7.81	7.85	7.89	7.93	7.97	8.01	8.05	8.09	8.13	190
200	8.13	8.17	8.21	8.25	8.29	8.33	8.37	8.41	8.46	8.50	8.54	200
° C	0	1	2	3	4	5	6	7	8	9	10	° C

# Table 6. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
Millivolts												
200	8.13	8.17	8.21	8.25	8.29	8.33	8.37	8.41	8.46	8.50	8.54	200
210	8.54	8.58	8.62	8.66	8.70	8.74	8.78	8.82	8.86	8.90	8.94	210
220	8.94	8.98	9.02	9.06	9.10	9.14	9.18	9.22	9.26	9.30	9.34	220
230	9.34	9.38	9.42	9.46	9.50	9.54	9.59	9.63	9.67	9.71	9.75	230
240	9.75	9.79	9.83	9.87	9.91	9.95	9.99	10.03	10.07	10.11	10.16	240
250	10.16	10.20	10.24	10.28	10.32	10.36	10.40	10.44	10.48	10.52	10.57	250
260	10.57	10.61	10.65	10.69	10.73	10.77	10.81	10.85	10.89	10.93	10.98	260
270	10.98	11.02	11.06	11.10	11.14	11.18	11.22	11.26	11.30	11.34	11.39	270
280	11.39	11.43	11.47	11.51	11.55	11.59	11.63	11.67	11.72	11.76	11.80	280
290	11.80	11.84	11.88	11.92	11.96	12.01	12.05	12.09	12.13	12.17	12.21	290
300	12.21	12.25	12.29	12.34	12.38	12.42	12.46	12.50	12.54	12.58	12.63	300
310	12.63	12.67	12.71	12.75	12.79	12.83	12.88	12.92	12.96	13.00	13.04	310
320	13.04	13.08	13.12	13.17	13.21	13.25	13.29	13.33	13.37	13.42	13.46	320
330	13.46	13.50	13.54	13.58	13.62	13.67	13.71	13.75	13.79	13.83	13.88	330
340	13.88	13.92	13.96	14.00	14.04	14.09	14.13	14.17	14.21	14.25	14.29	340
350	14.29	14.34	14.38	14.42	14.46	14.50	14.55	14.59	14.63	14.67	14.71	350
360	14.71	14.76	14.80	14.84	14.88	14.92	14.97	15.01	15.05	15.09	15.13	360
370	15.13	15.18	15.22	15.26	15.30	15.34	15.39	15.43	15.47	15.51	15.55	370
380	15.55	15.60	15.64	15.68	15.72	15.76	15.81	15.85	15.89	15.93	15.98	380
390	15.98	16.02	16.06	16.10	16.14	16.19	16.23	16.27	16.31	16.36	16.40	390
400	16.40	16.44	16.48	16.52	16.57	16.61	16.65	16.69	16.74	16.78	16.82	400
410	16.82	16.86	16.91	16.95	16.99	17.03	17.07	17.12	17.16	17.20	17.24	410
420	17.24	17.29	17.33	17.37	17.41	17.46	17.50	17.54	17.58	17.62	17.67	420
430	17.67	17.71	17.75	17.79	17.84	17.88	17.92	17.96	18.01	18.05	18.09	430
440	18.09	18.13	18.17	18.22	18.26	18.30	18.34	18.39	18.43	18.47	18.51	440
450	18.51	18.56	18.60	18.64	18.68	18.73	18.77	18.81	18.85	18.90	18.94	450
460	18.94	18.98	19.02	19.07	19.11	19.15	19.19	19.24	19.28	19.32	19.36	460
470	19.36	19.41	19.45	19.49	19.54	19.58	19.62	19.66	19.71	19.75	19.79	470
480	19.79	19.84	19.88	19.92	19.96	20.01	20.05	20.09	20.13	20.18	20.22	480
490	20.22	20.26	20.31	20.35	20.39	20.43	20.48	20.52	20.56	20.60	20.65	490
500	20.65	20.69	20.73	20.77	20.82	20.86	20.90	20.94	20.99	21.03	21.07	500
510	21.07	21.11	21.16	21.20	21.24	21.28	21.32	21.37	21.41	21.45	21.50	510
520	21.50	21.54	21.58	21.63	21.67	21.71	21.75	21.80	21.84	21.88	21.92	520
530	21.92	21.97	22.01	22.05	22.09	22.14	22.18	22.22	22.26	22.31	22.35	530
540	22.35	22.39	22.43	22.48	22.52	22.56	22.61	22.65	22.69	22.73	22.78	540
550	22.78	22.82	22.86	22.90	22.95	22.99	23.03	23.07	23.12	23.16	23.20	550
560	23.20	23.25	23.29	23.33	23.38	23.42	23.46	23.50	23.54	23.59	23.63	560
570	23.63	23.67	23.72	23.76	23.80	23.84	23.89	23.93	23.97	24.01	24.06	570
580	24.06	24.10	24.14	24.18	24.23	24.27	24.31	24.36	24.40	24.44	24.49	580
590	24.49	24.53	24.57	24.61	24.65	24.70	24.74	24.78	24.83	24.87	24.91	590
600	24.91	24.95	25.00	25.04	25.08	25.12	25.17	25.21	25.25	25.29	25.34	600
°C	0	1	2	3	4	5	6	7	8	9	10	°C

**Table 6. Chromel-Alumel Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
	Millivolts											
<b>600</b>	24.91	24.95	25.00	25.04	25.08	25.12	25.17	25.21	25.25	25.29	25.34	<b>600</b>
<b>610</b>	25.34	25.38	25.42	25.47	25.51	25.55	25.59	25.64	25.68	25.72	25.76	<b>610</b>
<b>620</b>	25.76	25.81	25.85	25.89	25.93	25.98	26.02	26.06	26.10	26.15	26.19	<b>620</b>
<b>630</b>	26.19	26.23	26.27	26.32	26.36	26.40	26.44	26.48	26.53	26.57	26.61	<b>630</b>
<b>640</b>	26.61	26.65	26.70	26.74	26.78	26.82	26.86	26.91	26.95	26.99	27.03	<b>640</b>
<b>650</b>	27.03	27.07	27.12	27.16	27.20	27.24	27.28	27.33	27.37	27.41	27.45	<b>650</b>
<b>660</b>	27.45	27.49	27.54	27.58	27.62	27.66	27.71	27.75	27.79	27.83	27.87	<b>660</b>
<b>670</b>	27.87	27.92	27.96	28.00	28.04	28.08	28.13	28.17	28.21	28.25	28.29	<b>670</b>
<b>680</b>	28.29	28.34	28.38	28.42	28.46	28.50	28.55	28.59	28.63	28.67	28.72	<b>680</b>
<b>690</b>	28.72	28.76	28.80	28.84	28.88	28.93	28.97	29.01	29.05	29.10	29.14	<b>690</b>
<b>700</b>	29.14	29.18	29.22	29.26	29.30	29.35	29.39	29.43	29.47	29.52	29.56	<b>700</b>
<b>710</b>	29.56	29.60	29.64	29.68	29.72	29.77	29.81	29.85	29.89	29.93	29.97	<b>710</b>
<b>720</b>	29.97	30.02	30.06	30.10	30.14	30.18	30.23	30.27	30.31	30.35	30.39	<b>720</b>
<b>730</b>	30.39	30.44	30.48	30.52	30.56	30.60	30.65	30.69	30.73	30.77	30.81	<b>730</b>
<b>740</b>	30.81	30.85	30.90	30.94	30.98	31.02	31.06	31.10	31.15	31.19	31.23	<b>740</b>
<b>750</b>	31.23	31.27	31.31	31.35	31.40	31.44	31.48	31.52	31.56	31.60	31.65	<b>750</b>
<b>760</b>	31.65	31.69	31.73	31.77	31.81	31.85	31.90	31.94	31.98	32.02	32.06	<b>760</b>
<b>770</b>	32.06	32.10	32.15	32.19	32.23	32.27	32.31	32.35	32.39	32.43	32.48	<b>770</b>
<b>780</b>	32.48	32.52	32.56	32.60	32.64	32.68	32.72	32.76	32.81	32.85	32.89	<b>780</b>
<b>790</b>	32.89	32.93	32.97	33.01	33.05	33.09	33.13	33.18	33.22	33.26	33.30	<b>790</b>
<b>800</b>	33.30	33.34	33.38	33.42	33.46	33.50	33.54	33.59	33.63	33.67	33.71	<b>800</b>
<b>810</b>	33.71	33.75	33.79	33.83	33.87	33.91	33.95	33.99	34.04	34.08	34.12	<b>810</b>
<b>820</b>	34.12	34.16	34.20	34.24	34.28	34.32	34.36	34.40	34.44	34.48	34.53	<b>820</b>
<b>830</b>	34.53	34.57	34.61	34.65	34.69	34.73	34.77	34.81	34.85	34.89	34.93	<b>830</b>
<b>840</b>	34.93	34.97	35.02	35.06	35.10	35.14	35.18	35.22	35.26	35.30	35.34	<b>840</b>
<b>850</b>	35.34	35.38	35.42	35.46	35.50	35.54	35.58	35.63	35.67	35.71	35.75	<b>850</b>
<b>860</b>	35.75	35.79	35.83	35.87	35.91	35.95	35.99	36.03	36.07	36.11	36.15	<b>860</b>
<b>870</b>	36.15	36.19	36.23	36.27	36.31	36.35	36.39	36.43	36.47	36.51	36.55	<b>870</b>
<b>880</b>	36.55	36.59	36.63	36.67	36.72	36.76	36.80	36.84	36.88	36.92	36.96	<b>880</b>
<b>890</b>	36.96	37.00	37.04	37.08	37.12	37.16	37.20	37.24	37.28	37.32	37.36	<b>890</b>
<b>900</b>	37.36	37.40	37.44	37.48	37.52	37.56	37.60	37.64	37.68	37.72	37.76	<b>900</b>
<b>910</b>	37.76	37.80	37.84	37.88	37.92	37.96	38.00	38.04	38.08	38.12	38.16	<b>910</b>
<b>920</b>	38.16	38.20	38.24	38.28	38.32	38.36	38.40	38.44	38.48	38.52	38.56	<b>920</b>
<b>930</b>	38.56	38.60	38.64	38.68	38.72	38.76	38.80	38.84	38.88	38.92	38.95	<b>930</b>
<b>940</b>	38.95	38.99	39.03	39.07	39.11	39.15	39.19	39.23	39.27	39.31	39.35	<b>940</b>
<b>950</b>	39.35	39.39	39.43	39.47	39.51	39.55	39.59	39.63	39.67	39.71	39.75	<b>950</b>
<b>960</b>	39.75	39.79	39.83	39.86	39.90	39.94	39.98	40.02	40.06	40.10	40.14	<b>960</b>
<b>970</b>	40.14	40.18	40.22	40.26	40.30	40.34	40.38	40.41	40.45	40.49	40.53	<b>970</b>
<b>980</b>	40.53	40.57	40.61	40.65	40.69	40.73	40.77	40.81	40.85	40.89	40.92	<b>980</b>
<b>990</b>	40.92	40.96	41.00	41.04	41.08	41.12	41.16	41.20	41.24	41.28	41.31	<b>990</b>
<b>1,000</b>	41.31	41.35	41.39	41.43	41.47	41.51	41.55	41.59	41.63	41.67	41.70	<b>1,000</b>
°C	0	1	2	3	4	5	6	7	8	9	10	°C



**Table 6. Chromel-Alumel Thermocouples—Con.**

**(Electromotive Force in Absolute Millivolts. Temperatures in Degree C (Int. 1948). Reference Junctions at 0° C.)**

°C	0	1	2	3	4	5	6	7	8	9	10	°C
	Millivolts											
1,000	41.31	41.35	41.39	41.43	41.47	41.51	41.55	41.59	41.63	41.67	41.70	1,000
1,010	41.70	41.74	41.78	41.82	41.86	41.90	41.94	41.98	42.02	42.05	42.09	1,010
1,020	42.09	42.13	42.17	42.21	42.25	42.29	42.33	42.36	42.40	42.44	42.48	1,020
1,030	42.48	42.52	42.56	42.60	42.63	42.67	42.71	42.75	42.79	42.83	42.87	1,030
1,040	42.87	42.90	42.94	42.98	43.02	43.06	43.10	43.14	43.17	43.21	43.25	1,040
1,050	43.25	43.29	43.33	43.37	43.41	43.44	43.48	43.52	43.56	43.60	43.63	1,050
1,060	43.63	43.67	43.71	43.75	43.79	43.83	43.87	43.90	43.94	43.98	44.02	1,060
1,070	44.02	44.06	44.10	44.13	44.17	44.21	44.25	44.29	44.33	44.36	44.40	1,070
1,080	44.40	44.44	44.48	44.52	44.55	44.59	44.63	44.67	44.71	44.74	44.78	1,080
1,090	44.78	44.82	44.86	44.90	44.93	44.97	45.01	45.05	45.09	45.12	45.16	1,090
1,100	45.16	45.20	45.24	45.27	45.31	45.35	45.39	45.43	45.46	45.50	45.54	1,100
1,110	45.54	45.58	45.62	45.65	45.69	45.73	45.77	45.80	45.84	45.88	45.92	1,110
1,120	45.92	45.96	45.99	46.03	46.07	46.11	46.14	46.18	46.22	46.26	46.29	1,120
1,130	46.29	46.33	46.37	46.41	46.44	46.48	46.52	46.56	46.59	46.63	46.67	1,130
1,140	46.67	46.70	46.74	46.78	46.82	46.85	46.89	46.93	46.97	47.00	47.04	1,140
1,150	47.04	47.08	47.12	47.15	47.19	47.23	47.26	47.30	47.34	47.38	47.41	1,150
1,160	47.41	47.45	47.49	47.52	47.56	47.60	47.63	47.67	47.71	47.75	47.78	1,160
1,170	47.78	47.82	47.86	47.89	47.93	47.97	48.00	48.04	48.08	48.12	48.15	1,170
1,180	48.15	48.19	48.23	48.26	48.30	48.34	48.37	48.41	48.45	48.48	48.52	1,180
1,190	48.52	48.56	48.59	48.63	48.67	48.70	48.74	48.78	48.81	48.85	48.89	1,190
1,200	48.89	48.92	48.96	49.00	49.03	49.07	49.11	49.14	49.18	49.22	49.25	1,200
1,210	49.25	49.29	49.32	49.36	49.40	49.43	49.47	49.51	49.54	49.58	49.62	1,210
1,220	49.62	49.65	49.69	49.72	49.76	49.80	49.83	49.87	49.90	49.94	49.98	1,220
1,230	49.98	50.01	50.05	50.08	50.12	50.16	50.19	50.23	50.26	50.30	50.34	1,230
1,240	50.34	50.37	50.41	50.44	50.48	50.52	50.55	50.59	50.62	50.66	50.69	1,240
1,250	50.69	50.73	50.77	50.80	50.84	50.87	50.91	50.94	50.98	51.02	51.05	1,250
1,260	51.05	51.09	51.12	51.16	51.19	51.23	51.27	51.30	51.34	51.37	51.41	1,260
1,270	51.41	51.44	51.48	51.51	51.55	51.58	51.62	51.66	51.69	51.73	51.76	1,270
1,280	51.76	51.80	51.83	51.87	51.90	51.94	51.97	52.01	52.04	52.08	52.11	1,280
1,290	52.11	52.15	52.18	52.22	52.25	52.29	52.32	52.36	52.39	52.43	52.46	1,290
1,300	52.46	52.50	52.53	52.57	52.60	52.64	52.67	52.71	52.74	52.78	52.81	1,300
1,310	52.81	52.85	52.88	52.92	52.95	52.99	53.02	53.06	53.09	53.13	53.16	1,310
1,320	53.16	53.20	53.23	53.27	53.30	53.34	53.37	53.41	53.44	53.47	53.51	1,320
1,330	53.51	53.54	53.58	53.61	53.65	53.68	53.72	53.75	53.79	53.82	53.85	1,330
1,340	53.85	53.89	53.92	53.96	53.99	54.03	54.06	54.10	54.13	54.16	54.20	1,340
1,350	54.20	54.23	54.27	54.30	54.34	54.37	54.40	54.44	54.47	54.51	54.54	1,350
1,360	54.54	54.57	54.61	54.64	54.68	54.71	54.74	54.78	54.81	54.85	54.88	1,360
1,370	54.88	54.91	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,370
°C	0	1	2	3	4	5	6	7	8	9	10	°C

# Table 7. Iron-Constantan Thermocouples (Modified 1913)

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts
Degrees C												
-7.00	-166	-169	-173	-176	-180	-184	-188	-192	-196	-----	-----	-7.00
-6.00	-136	-138	-141	-144	-147	-150	-153	-156	-159	-163	-166	-6.00
-5.00	-109	-112	-114	-117	-119	-122	-125	-127	-130	-133	-136	-5.00
-4.00	-85	-87	-90	-92	-94	-97	-99	-102	-104	-107	-109	-4.00
-3.00	-62	-65	-67	-69	-71	-74	-76	-78	-80	-83	-85	-3.00
-2.00	-41	-43	-45	-47	-49	-52	-54	-56	-58	-60	-62	-2.00
-1.00	-20	-22	-24	-26	-28	-30	-32	-35	-37	-39	-41	-1.00
(-)0.00	0	-2	-4	-6	-8	-10	-12	-14	-16	-18	-20	(-)0.00
(+)0.00	0	2	4	6	8	10	12	14	16	18	20	(+)0.00
1.00	20	22	24	25	27	29	31	33	35	37	39	1.00
2.00	39	41	43	45	47	48	50	52	54	56	58	2.00
3.00	58	60	62	63	65	67	69	71	73	75	77	3.00
4.00	77	78	80	82	84	86	88	90	91	93	95	4.00
5.00	95	97	99	101	102	104	106	108	110	112	113	5.00
6.00	113	115	117	119	121	123	124	126	128	130	132	6.00
7.00	132	134	135	137	139	141	143	144	146	148	150	7.00
8.00	150	152	154	155	157	159	161	163	164	166	168	8.00
9.00	168	170	172	173	175	177	179	181	182	184	186	9.00
10.00	186	188	190	191	193	195	197	199	200	202	204	10.00
11.00	204	206	208	209	211	213	215	217	218	220	222	11.00
12.00	222	224	226	227	229	231	233	235	236	238	240	12.00
13.00	240	242	244	245	247	249	251	253	254	256	258	13.00
14.00	258	260	262	263	265	267	269	271	272	274	276	14.00
15.00	276	278	280	281	283	285	287	289	290	292	294	15.00
16.00	294	296	298	300	301	303	305	307	309	310	312	16.00
17.00	312	314	316	318	319	321	323	325	327	329	330	17.00
18.00	330	332	334	336	338	339	341	343	345	347	348	18.00
19.00	348	350	352	354	356	357	359	361	363	365	366	19.00
20.00	366	368	370	372	374	376	377	379	381	383	385	20.00
21.00	385	386	388	390	392	394	395	397	399	401	403	21.00
22.00	403	405	406	408	410	412	414	416	417	419	421	22.00
23.00	421	423	424	426	428	430	432	434	435	437	439	23.00
24.00	439	441	443	444	446	448	450	452	453	455	457	24.00
25.00	457	459	461	463	464	466	468	470	472	473	475	25.00
26.00	475	477	479	481	482	484	486	488	489	491	493	26.00
27.00	493	495	497	499	500	502	504	506	507	509	511	27.00
28.00	511	513	514	516	518	520	522	523	525	527	529	28.00
29.00	529	530	532	534	536	537	539	541	543	544	546	29.00
30.00	546	548	550	551	553	555	557	558	560	562	564	30.00
Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts

**Table 7. Iron-Constantan Thermocouples (Modified 1913)—Continued**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts
Degrees C												
30.00	546	548	550	551	553	555	557	558	560	562	564	30.00
31.00	564	565	567	569	571	572	574	576	577	579	581	31.00
32.00	581	583	584	586	588	589	591	593	595	596	598	32.00
33.00	598	600	601	603	605	607	608	610	612	613	615	33.00
34.00	615	617	618	620	622	624	625	627	629	630	632	34.00
35.00	632	634	635	637	639	640	642	644	645	647	649	35.00
36.00	649	650	652	654	655	657	659	660	662	664	665	36.00
37.00	665	667	668	670	672	673	675	677	678	680	681	37.00
38.00	681	683	685	686	688	690	691	693	694	696	698	38.00
39.00	698	699	701	702	704	706	707	709	710	712	713	39.00
40.00	713	715	717	718	720	721	723	725	726	728	729	40.00
41.00	729	731	732	734	736	737	739	740	742	743	745	41.00
42.00	745	747	748	750	751	753	754	756	757	759	761	42.00
Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts

**Table 8. Iron-Constantan Thermocouples (Modified 1913)**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
Millivolts												
-190	-7.66	-7.69	-7.71	-7.73	-7.76	-7.78	-7.80	-7.82	-7.84	-7.86	-7.88	-190
-180	-7.40	-7.43	-7.46	-7.49	-7.51	-7.54	-7.56	-7.59	-7.61	-7.64	-7.66	-180
-170	-7.12	-7.15	-7.18	-7.21	-7.24	-7.27	-7.30	-7.32	-7.35	-7.38	-7.40	-170
-160	-6.82	-6.85	-6.88	-6.91	-6.94	-6.97	-7.00	-7.03	-7.06	-7.09	-7.12	-160
-150	-6.50	-6.53	-6.56	-6.60	-6.63	-6.66	-6.69	-6.72	-6.76	-6.79	-6.82	-150
-140	-6.16	-6.19	-6.22	-6.26	-6.29	-6.33	-6.36	-6.40	-6.43	-6.46	-6.50	-140
-130	-5.80	-5.84	-5.87	-5.91	-5.94	-5.98	-6.01	-6.05	-6.08	-6.12	-6.16	-130
-120	-5.42	-5.46	-5.50	-5.54	-5.58	-5.61	-5.65	-5.69	-5.72	-5.76	-5.80	-120
-110	-5.03	-5.07	-5.11	-5.15	-5.19	-5.23	-5.27	-5.31	-5.35	-5.38	-5.42	-110
-100	-4.63	-4.67	-4.71	-4.75	-4.79	-4.83	-4.87	-4.91	-4.95	-4.99	-5.03	-100
-90	-4.21	-4.25	-4.30	-4.34	-4.38	-4.42	-4.46	-4.50	-4.55	-4.59	-4.63	-90
-80	-3.78	-3.82	-3.87	-3.91	-3.96	-4.00	-4.04	-4.08	-4.13	-4.17	-4.21	-80
-70	-3.34	-3.38	-3.43	-3.47	-3.52	-3.56	-3.60	-3.65	-3.69	-3.74	-3.78	-70
-60	-2.89	-2.94	-2.98	-3.03	-3.07	-3.12	-3.16	-3.21	-3.25	-3.30	-3.34	-60
-50	-2.43	-2.48	-2.52	-2.57	-2.62	-2.66	-2.71	-2.75	-2.80	-2.84	-2.89	-50
-40	-1.96	-2.01	-2.06	-2.10	-2.15	-2.20	-2.24	-2.29	-2.34	-2.38	-2.43	-40
-30	-1.48	-1.53	-1.58	-1.63	-1.67	-1.72	-1.77	-1.82	-1.87	-1.91	-1.96	-30
-20	-1.00	-1.04	-1.09	-1.14	-1.19	-1.24	-1.29	-1.34	-1.39	-1.43	-1.48	-20
-10	-0.50	-0.55	-0.60	-0.65	-0.70	-0.75	-0.80	-0.85	-0.90	-0.95	-1.00	-10
(-)0	0.00	-0.05	-0.10	-0.15	-0.20	-0.25	-0.30	-0.35	-0.40	-0.45	-0.50	(-)0
(+)0	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	(+)0
10	0.50	0.56	0.61	0.66	0.71	0.76	0.81	0.86	0.91	0.97	1.02	10
20	1.02	1.07	1.12	1.17	1.22	1.28	1.33	1.38	1.43	1.48	1.54	20
30	1.54	1.59	1.64	1.69	1.74	1.80	1.85	1.90	1.95	2.00	2.06	30
40	2.06	2.11	2.16	2.22	2.27	2.32	2.37	2.42	2.48	2.53	2.58	40
50	2.58	2.64	2.69	2.74	2.80	2.85	2.90	2.96	3.01	3.06	3.11	50
60	3.11	3.17	3.22	3.27	3.33	3.38	3.43	3.49	3.54	3.60	3.65	60
70	3.65	3.70	3.76	3.81	3.86	3.92	3.97	4.02	4.08	4.13	4.19	70
80	4.19	4.24	4.29	4.35	4.40	4.46	4.51	4.56	4.62	4.67	4.73	80
90	4.73	4.78	4.83	4.89	4.94	5.00	5.05	5.10	5.16	5.21	5.27	90
100	5.27	5.32	5.38	5.43	5.48	5.54	5.59	5.65	5.70	5.76	5.81	100
110	5.81	5.86	5.92	5.97	6.03	6.08	6.14	6.19	6.25	6.30	6.36	110
120	6.36	6.41	6.47	6.52	6.58	6.63	6.68	6.74	6.79	6.85	6.90	120
130	6.90	6.96	7.01	7.07	7.12	7.18	7.23	7.29	7.34	7.40	7.45	130
140	7.45	7.51	7.56	7.62	7.67	7.73	7.78	7.84	7.89	7.95	8.00	140
150	8.00	8.06	8.12	8.17	8.23	8.28	8.34	8.39	8.45	8.50	8.56	150
160	8.56	8.61	8.67	8.72	8.78	8.84	8.89	8.95	9.00	9.06	9.11	160
170	9.11	9.17	9.22	9.28	9.33	9.39	9.44	9.50	9.56	9.61	9.67	170
180	9.67	9.72	9.78	9.83	9.89	9.95	10.00	10.06	10.11	10.17	10.22	180
190	10.22	10.28	10.34	10.39	10.45	10.50	10.56	10.61	10.67	10.72	10.78	190
200	10.78	10.84	10.89	10.95	11.00	11.06	11.12	11.17	11.23	11.28	11.34	200
°C	0	1	2	3	4	5	6	7	8	9	10	°C

**Table 8. Iron-Constantan Thermocouples (Modified 1913)—Continued**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
	Millivolts											
<b>200</b>	10.78	10.84	10.89	10.95	11.00	11.06	11.12	11.17	11.23	11.28	11.34	<b>200</b>
<b>210</b>	11.34	11.39	11.45	11.50	11.56	11.62	11.67	11.73	11.78	11.84	11.89	<b>210</b>
<b>220</b>	11.89	11.95	12.00	12.06	12.12	12.17	12.23	12.28	12.34	12.39	12.45	<b>220</b>
<b>230</b>	12.45	12.50	12.56	12.62	12.67	12.73	12.78	12.84	12.89	12.95	13.01	<b>230</b>
<b>240</b>	13.01	13.06	13.12	13.17	13.23	13.28	13.34	13.40	13.45	13.51	13.56	<b>240</b>
<b>250</b>	13.56	13.62	13.67	13.73	13.78	13.84	13.89	13.95	14.00	14.06	14.12	<b>250</b>
<b>260</b>	14.12	14.17	14.23	14.28	14.34	14.39	14.45	14.50	14.56	14.61	14.67	<b>260</b>
<b>270</b>	14.67	14.72	14.78	14.83	14.89	14.94	15.00	15.06	15.11	15.17	15.22	<b>270</b>
<b>280</b>	15.22	15.28	15.33	15.39	15.44	15.50	15.55	15.61	15.66	15.72	15.77	<b>280</b>
<b>290</b>	15.77	15.83	15.88	15.94	16.00	16.05	16.11	16.16	16.22	16.27	16.33	<b>290</b>
<b>300</b>	16.33	16.38	16.44	16.49	16.55	16.60	16.66	16.71	16.77	16.82	16.88	<b>300</b>
<b>310</b>	16.88	16.93	16.99	17.04	17.10	17.15	17.21	17.26	17.32	17.37	17.43	<b>310</b>
<b>320</b>	17.43	17.48	17.54	17.60	17.65	17.71	17.76	17.82	17.87	17.93	17.98	<b>320</b>
<b>330</b>	17.98	18.04	18.09	18.15	18.20	18.26	18.32	18.37	18.43	18.48	18.54	<b>330</b>
<b>340</b>	18.54	18.59	18.65	18.70	18.76	18.81	18.87	18.92	18.98	19.03	19.09	<b>340</b>
<b>350</b>	19.09	19.14	19.20	19.26	19.31	19.37	19.42	19.48	19.53	19.59	19.64	<b>350</b>
<b>360</b>	19.64	19.70	19.75	19.81	19.86	19.92	19.97	20.03	20.08	20.14	20.20	<b>360</b>
<b>370</b>	20.20	20.25	20.31	20.36	20.42	20.47	20.53	20.58	20.64	20.69	20.75	<b>370</b>
<b>380</b>	20.75	20.80	20.86	20.91	20.97	21.02	21.08	21.13	21.19	21.24	21.30	<b>380</b>
<b>390</b>	21.30	21.35	21.41	21.46	21.52	21.57	21.63	21.68	21.74	21.79	21.85	<b>390</b>
<b>400</b>	21.85	21.90	21.96	22.02	22.07	22.13	22.18	22.24	22.29	22.35	22.40	<b>400</b>
<b>410</b>	22.40	22.46	22.51	22.57	22.62	22.68	22.73	22.79	22.84	22.90	22.95	<b>410</b>
<b>420</b>	22.95	23.01	23.06	23.12	23.17	23.23	23.28	23.34	23.39	23.45	23.50	<b>420</b>
<b>430</b>	23.50	23.56	23.61	23.67	23.72	23.78	23.83	23.89	23.94	24.00	24.06	<b>430</b>
<b>440</b>	24.06	24.11	24.17	24.22	24.28	24.33	24.39	24.44	24.50	24.55	24.61	<b>440</b>
<b>450</b>	24.61	24.66	24.72	24.77	24.83	24.88	24.94	25.00	25.05	25.11	25.16	<b>450</b>
<b>460</b>	25.16	25.22	25.27	25.33	25.38	25.44	25.49	25.55	25.60	25.66	25.72	<b>460</b>
<b>470</b>	25.72	25.77	25.83	25.88	25.94	25.99	26.05	26.10	26.16	26.22	26.27	<b>470</b>
<b>480</b>	26.27	26.33	26.38	26.44	26.49	26.55	26.61	26.66	26.72	26.77	26.83	<b>480</b>
<b>490</b>	26.83	26.89	26.94	27.00	27.05	27.11	27.17	27.22	27.28	27.33	27.39	<b>490</b>
<b>500</b>	27.39	27.45	27.50	27.56	27.61	27.67	27.73	27.78	27.84	27.90	27.95	<b>500</b>
<b>510</b>	27.95	28.01	28.07	28.12	28.18	28.23	28.29	28.35	28.40	28.46	28.52	<b>510</b>
<b>520</b>	28.52	28.57	28.63	28.69	28.74	28.80	28.86	28.91	28.97	29.02	29.08	<b>520</b>
<b>530</b>	29.08	29.14	29.20	29.25	29.31	29.37	29.42	29.48	29.54	29.59	29.65	<b>530</b>
<b>540</b>	29.65	29.71	29.76	29.82	29.88	29.94	29.99	30.05	30.11	30.16	30.22	<b>540</b>
<b>550</b>	30.22	30.28	30.34	30.39	30.45	30.51	30.57	30.62	30.68	30.74	30.80	<b>550</b>
<b>560</b>	30.80	30.85	30.91	30.97	31.02	31.08	31.14	31.20	31.26	31.31	31.37	<b>560</b>
<b>570</b>	31.37	31.43	31.49	31.54	31.60	31.66	31.72	31.78	31.83	31.89	31.95	<b>570</b>
<b>580</b>	31.95	32.01	32.06	32.12	32.18	32.24	32.30	32.36	32.41	32.47	32.53	<b>580</b>
<b>590</b>	32.53	32.59	32.65	32.71	32.76	32.82	32.88	32.94	33.00	33.06	33.11	<b>590</b>
<b>600</b>	33.11	33.17	33.23	33.29	33.35	33.41	33.46	33.52	33.58	33.64	33.70	<b>600</b>
°C	0	1	2	3	4	5	6	7	8	9	10	°C

# Table 8. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
	Millivolts											
<b>600</b>	33.11	33.17	33.23	33.29	33.35	33.41	33.46	33.52	33.58	33.64	33.70	<b>600</b>
<b>610</b>	33.70	33.76	33.82	33.88	33.94	33.99	34.05	34.11	34.17	34.23	34.29	<b>610</b>
<b>620</b>	34.29	34.35	34.41	34.47	34.53	34.58	34.64	34.70	34.76	34.82	34.88	<b>620</b>
<b>630</b>	34.88	34.94	35.00	35.06	35.12	35.18	35.24	35.30	35.36	35.42	35.48	<b>630</b>
<b>640</b>	35.48	35.54	35.60	35.66	35.72	35.78	35.84	35.90	35.96	36.02	36.08	<b>640</b>
<b>650</b>	36.08	36.14	36.20	36.26	36.32	36.38	36.44	36.50	36.56	36.62	36.69	<b>650</b>
<b>660</b>	36.69	36.75	36.81	36.87	36.93	36.99	37.05	37.11	37.18	37.24	37.30	<b>660</b>
<b>670</b>	37.30	37.36	37.42	37.48	37.54	37.60	37.66	37.73	37.79	37.85	37.91	<b>670</b>
<b>680</b>	37.91	37.97	38.04	38.10	38.16	38.22	38.28	38.34	38.41	38.47	38.53	<b>680</b>
<b>690</b>	38.53	38.59	38.66	38.72	38.78	38.84	38.90	38.97	39.03	39.09	39.15	<b>690</b>
<b>700</b>	39.15	39.22	39.28	39.34	39.40	39.47	39.53	39.59	39.65	39.72	39.78	<b>700</b>
<b>710</b>	39.78	39.84	39.91	39.97	40.03	40.10	40.16	40.22	40.28	40.35	40.41	<b>710</b>
<b>720</b>	40.41	40.48	40.54	40.60	40.66	40.73	40.79	40.86	40.92	40.98	41.05	<b>720</b>
<b>730</b>	41.05	41.11	41.17	41.24	41.30	41.36	41.43	41.49	41.56	41.62	41.68	<b>730</b>
<b>740</b>	41.68	41.75	41.81	41.87	41.94	42.00	42.07	42.13	42.19	42.26	42.32	<b>740</b>
<b>750</b>	42.32	42.38	42.45	42.51	42.58	42.64	42.70	42.77	42.83	42.90	42.96	<b>750</b>
°C	0	1	2	3	4	5	6	7	8	9	10	°C

# Table 9. Copper-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

Millivolts	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	Millivolts
	Degrees C											
-5.00	-169.1	-174.3	-179.7	-185.4	-191.3	-197.2	-203.1	-209.0	-214.9	-220.8	-226.7	-5.00
-4.00	-124.4	-128.4	-132.5	-136.7	-141.0	-145.4	-149.9	-154.5	-159.2	-164.1	-169.1	-4.00
-3.00	-87.9	-91.3	-94.8	-98.3	-101.8	-105.4	-109.1	-112.8	-116.7	-120.5	-124.4	-3.00
-2.00	-55.9	-58.9	-62.0	-65.1	-68.3	-71.4	-74.6	-77.9	-81.2	-84.5	-87.9	-2.00
-1.00	-26.9	-29.7	-32.5	-35.3	-38.2	-41.1	-44.0	-46.9	-49.9	-52.9	-55.9	-1.00
(-)0.00	0.0	-2.6	-5.2	-7.9	-10.5	-13.2	-15.9	-18.6	-21.3	-24.1	-26.9	(-)0.00
(+)0.00	0.0	2.6	5.2	7.7	10.3	12.8	15.3	17.8	20.3	22.8	25.3	(+)0.00
1.00	25.3	27.7	30.1	32.6	35.0	37.4	39.8	42.1	44.5	46.8	49.2	1.00
2.00	49.2	51.5	53.8	56.2	58.5	60.8	63.0	65.3	67.6	69.8	72.1	2.00
3.00	72.1	74.3	76.5	78.7	81.0	83.2	85.3	87.5	89.7	91.9	94.0	3.00
4.00	94.0	96.2	98.3	100.5	102.6	104.7	106.9	109.0	111.1	113.2	115.3	4.00
5.00	115.3	117.4	119.4	121.5	123.6	125.6	127.7	129.8	131.8	133.8	135.9	5.00
6.00	135.9	137.9	139.9	141.9	143.9	145.9	147.9	149.9	151.9	153.9	155.9	6.00
7.00	155.9	157.9	159.8	161.8	163.8	165.7	167.7	169.6	171.6	173.5	175.4	7.00
8.00	175.4	177.4	179.3	181.2	183.1	185.1	187.0	188.9	190.8	192.7	194.6	8.00
9.00	194.6	196.5	198.3	200.2	202.1	204.0	205.8	207.7	209.6	211.4	213.3	9.00
10.00	213.3	215.1	217.0	218.8	220.7	222.5	224.4	226.2	228.0	229.8	231.7	10.00
11.00	231.7	233.5	235.3	237.1	238.9	240.7	242.6	244.4	246.2	247.9	249.7	11.00
12.00	249.7	251.5	253.3	255.1	256.9	258.7	260.4	262.2	264.0	265.8	267.5	12.00
13.00	267.5	269.3	271.1	272.8	274.6	276.3	278.1	279.8	281.6	283.3	285.1	13.00
14.00	285.1	286.8	288.5	290.3	292.0	293.7	295.5	297.2	298.9	300.6	302.3	14.00
15.00	302.3	304.1	305.8	307.5	309.2	310.9	312.6	314.3	316.0	317.7	319.4	15.00
16.00	319.4	321.1	322.8	324.5	326.2	327.9	329.6	331.2	332.9	334.6	336.3	16.00
17.00	336.3	338.0	339.6	341.3	343.0	344.7	346.3	348.0	349.7	351.3	353.0	17.00
18.00	353.0	354.6	356.3	357.9	359.6	361.2	362.9	364.6	366.2	367.8	369.5	18.00
19.00	369.5	371.1	372.8	374.4	376.0	377.7	379.3	380.9	382.6	384.2	385.8	19.00
20.00	385.8	387.5	389.1	390.7	392.3	393.9	395.6	397.2	398.8			20.00
Millivolts	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	Millivolts

# Table 10. Copper-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	1	2	3	4	5	6	7	8	9	10	° C
Millivolts												
-190	-5.379	-5.395	-5.411	-5.427	-5.443	-5.459	-5.475	-5.491	-5.507	-5.523	-5.539	-190
-180	-5.205	-5.223	-5.241	-5.258	-5.276	-5.294	-5.311	-5.328	-5.345	-5.362	-5.379	-180
-170	-5.018	-5.037	-5.056	-5.075	-5.094	-5.113	-5.132	-5.150	-5.169	-5.187	-5.205	-170
-160	-4.817	-4.838	-4.858	-4.878	-4.899	-4.919	-4.939	-4.959	-4.978	-4.998	-5.018	-160
-150	-4.603	-4.625	-4.647	-4.669	-4.690	-4.712	-4.733	-4.754	-4.775	-4.796	-4.817	-150
-140	-4.377	-4.400	-4.423	-4.446	-4.469	-4.492	-4.514	-4.537	-4.559	-4.581	-4.603	-140
-130	-4.138	-4.162	-4.187	-4.211	-4.235	-4.259	-4.283	-4.307	-4.330	-4.354	-4.377	-130
-120	-3.887	-3.912	-3.938	-3.964	-3.989	-4.014	-4.039	-4.064	-4.089	-4.114	-4.138	-120
-110	-3.624	-3.651	-3.678	-3.704	-3.730	-3.757	-3.783	-3.809	-3.835	-3.861	-3.887	-110
-100	-3.349	-3.377	-3.405	-3.432	-3.460	-3.488	-3.515	-3.542	-3.570	-3.597	-3.624	-100
-90	-3.062	-3.091	-3.120	-3.149	-3.178	-3.207	-3.235	-3.264	-3.292	-3.320	-3.349	-90
-80	-2.764	-2.794	-2.824	-2.854	-2.884	-2.914	-2.944	-2.974	-3.003	-3.033	-3.062	-80
-70	-2.455	-2.486	-2.518	-2.549	-2.580	-2.611	-2.642	-2.672	-2.703	-2.733	-2.764	-70
-60	-2.135	-2.167	-2.200	-2.232	-2.264	-2.296	-2.328	-2.360	-2.392	-2.423	-2.455	-60
-50	-1.804	-1.838	-1.871	-1.905	-1.938	-1.971	-2.004	-2.037	-2.070	-2.103	-2.135	-50
-40	-1.463	-1.498	-1.532	-1.567	-1.601	-1.635	-1.669	-1.703	-1.737	-1.771	-1.804	-40
-30	-1.112	-1.148	-1.183	-1.218	-1.254	-1.289	-1.324	-1.359	-1.394	-1.429	-1.463	-30
-20	-0.751	-0.788	-0.824	-0.860	-0.897	-0.933	-0.969	-1.005	-1.041	-1.076	-1.112	-20
-10	-0.380	-0.417	-0.455	-0.492	-0.530	-0.567	-0.604	-0.641	-0.678	-0.714	-0.751	-10
(-)0	0.000	-0.038	-0.077	-0.115	-0.153	-0.191	-0.229	-0.267	-0.305	-0.343	-0.380	(-)0
(+)0	0.000	0.058	0.077	0.116	0.154	0.193	0.232	0.271	0.311	0.350	0.389	(+)0
10	0.389	0.429	0.468	0.508	0.547	0.587	0.627	0.667	0.707	0.747	0.787	10
20	0.787	0.827	0.868	0.908	0.949	0.990	1.030	1.071	1.112	1.153	1.194	20
30	1.194	1.235	1.277	1.318	1.360	1.401	1.443	1.485	1.526	1.568	1.610	30
40	1.610	1.652	1.694	1.737	1.779	1.821	1.864	1.907	1.949	1.992	2.035	40
50	2.035	2.078	2.121	2.164	2.207	2.250	2.293	2.336	2.380	2.423	2.467	50
60	2.467	2.511	2.555	2.599	2.643	2.687	2.731	2.775	2.820	2.864	2.908	60
70	2.908	2.953	2.997	3.042	3.087	3.132	3.177	3.222	3.267	3.312	3.357	70
80	3.357	3.402	3.448	3.493	3.539	3.584	3.630	3.676	3.722	3.767	3.813	80
90	3.813	3.859	3.906	3.952	3.998	4.044	4.091	4.138	4.184	4.230	4.277	90
100	4.277	4.324	4.371	4.418	4.465	4.512	4.559	4.606	4.654	4.701	4.749	100
110	4.749	4.796	4.843	4.891	4.939	4.987	5.035	5.083	5.131	5.179	5.227	110
120	5.227	5.275	5.323	5.372	5.420	5.469	5.518	5.566	5.615	5.663	5.712	120
130	5.712	5.761	5.810	5.859	5.908	5.957	6.007	6.056	6.105	6.155	6.204	130
140	6.204	6.254	6.303	6.353	6.403	6.453	6.503	6.553	6.603	6.653	6.703	140
150	6.703	6.753	6.803	6.853	6.904	6.954	7.004	7.055	7.106	7.157	7.208	150
160	7.208	7.258	7.309	7.360	7.411	7.462	7.513	7.565	7.616	7.667	7.719	160
170	7.719	7.770	7.822	7.874	7.926	7.978	8.029	8.080	8.132	8.184	8.236	170
180	8.236	8.288	8.340	8.392	8.445	8.497	8.549	8.601	8.654	8.707	8.759	180
190	8.759	8.812	8.864	8.917	8.970	9.023	9.076	9.129	9.182	9.235	9.288	190
200	9.288	9.341	9.394	9.448	9.501	9.555	9.608	9.662	9.715	9.769	9.823	200
° C	0	1	2	3	4	5	6	7	8	9	10	° C



**Table 10. Copper-Constantan Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	1	2	3	4	5	6	7	8	9	10	° C
	Millivolts											
<b>200</b>	9.288	9.341	9.394	9.448	9.501	9.555	9.608	9.662	9.715	9.769	9.823	<b>200</b>
<b>210</b>	9.823	9.877	9.931	9.985	10.039	10.093	10.147	10.201	10.255	10.309	10.363	<b>210</b>
<b>220</b>	10.363	10.417	10.471	10.526	10.580	10.635	10.689	10.744	10.799	10.854	10.909	<b>220</b>
<b>230</b>	10.909	10.963	11.018	11.073	11.128	11.183	11.238	11.293	11.348	11.403	11.459	<b>230</b>
<b>240</b>	11.459	11.514	11.569	11.624	11.680	11.735	11.791	11.847	11.903	11.959	12.015	<b>240</b>
<b>250</b>	12.015	12.071	12.126	12.182	12.238	12.294	12.350	12.406	12.462	12.518	12.575	<b>250</b>
<b>260</b>	12.575	12.631	12.688	12.744	12.800	12.857	12.913	12.970	13.027	13.083	13.140	<b>260</b>
<b>270</b>	13.140	13.197	13.254	13.311	13.368	13.425	13.482	13.539	13.596	13.653	13.710	<b>270</b>
<b>280</b>	13.710	13.768	13.825	13.882	13.939	13.997	14.055	14.112	14.170	14.227	14.285	<b>280</b>
<b>290</b>	14.285	14.343	14.400	14.458	14.515	14.573	14.631	14.689	14.747	14.805	14.864	<b>290</b>
<b>300</b>	14.864	14.922	14.980	15.038	15.096	15.155	15.213	15.271	15.330	15.388	15.447	<b>300</b>
<b>310</b>	15.447	15.506	15.564	15.623	15.681	15.740	15.799	15.858	15.917	15.976	16.035	<b>310</b>
<b>320</b>	16.035	16.094	16.153	16.212	16.271	16.330	16.389	16.449	16.508	16.567	16.626	<b>320</b>
<b>330</b>	16.626	16.685	16.745	16.804	16.864	16.924	16.983	17.043	17.102	17.162	17.222	<b>330</b>
<b>340</b>	17.222	17.281	17.341	17.401	17.461	17.521	17.581	17.641	17.701	17.761	17.821	<b>340</b>
<b>350</b>	17.821	17.881	17.941	18.002	18.062	18.123	18.183	18.243	18.304	18.364	18.425	<b>350</b>
<b>360</b>	18.425	18.485	18.546	18.607	18.667	18.727	18.788	18.849	18.910	18.971	19.032	<b>360</b>
<b>370</b>	19.032	19.093	19.154	19.215	19.276	19.337	19.398	19.459	19.520	19.581	19.642	<b>370</b>
<b>380</b>	19.642	19.704	19.765	19.827	19.888	19.949	20.011	20.072	20.134	20.195	20.257	<b>380</b>
<b>390</b>	20.257	20.318	20.380	20.442	20.504	20.565	20.627	20.688	20.750	20.812	20.874	<b>390</b>
° C	0	1	2	3	4	5	6	7	8	9	10	° C

# Table 11. Chromel-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees C (Int. 1948). Reference Junctions at 0° C.)

° C	0	10	20	30	40	50	60	70	80	90	100	° C
	Millivolts											
-100	-5.18	-5.62	-6.04	-6.44	-6.83	-7.20	-7.55	-7.87	-8.17	-8.45	-8.71	-100
(-) 0	0.00	-0.58	-1.14	-1.70	-2.24	-2.77	-3.28	-3.78	-4.26	-4.73	-5.18	(-) 0
(+) 0	0.00	0.59	1.19	1.80	2.41	3.04	3.68	4.33	4.99	5.65	6.32	(+) 0
100	6.32	7.00	7.69	8.38	9.08	9.79	10.51	11.23	11.95	12.68	13.42	100
200	13.42	14.17	14.92	15.67	16.42	17.18	17.95	18.72	19.49	20.26	21.04	200
300	21.04	21.82	22.60	22.39	24.18	24.97	25.76	26.56	27.35	28.15	28.95	300
400	28.95	29.75	30.55	31.36	32.16	32.96	33.77	34.58	35.39	36.20	37.01	400
500	37.01	37.82	38.62	39.43	40.24	41.05	41.86	42.67	43.48	44.29	45.10	500
600	45.10	45.91	46.72	47.53	48.33	49.13	49.93	50.73	51.54	52.34	53.14	600
700	53.14	53.94	54.74	55.53	56.33	57.12	57.92	58.71	59.50	60.29	61.08	700
800	61.08	61.86	62.65	63.43	64.21	64.99	65.77	66.54	67.31	68.08	68.85	800
900	68.85	69.62	70.39	71.15	71.92	72.68	73.44	74.20	74.95	75.70	76.45	900
° C	0	10	20	30	40	50	60	70	80	90	100	° C

## Part II. Fahrenheit Tables

**Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
0.000	32.0	35.3	38.6	41.8	45.0	48.2	51.4	54.5	57.7	60.8	63.9	0.000
.100	63.9	67.0	70.0	73.1	76.1	79.1	82.1	85.1	88.0	91.0	93.9	.100
.200	93.9	96.8	99.7	102.6	105.5	108.3	111.2	114.0	116.8	119.6	122.4	.200
.300	122.4	125.2	128.0	130.7	133.4	136.2	138.9	141.6	144.3	147.0	149.7	.300
.400	149.7	152.3	155.0	157.6	160.3	162.9	165.5	168.1	170.7	173.3	175.9	.400
.500	175.9	178.5	181.0	183.6	186.1	188.7	191.2	193.7	196.3	198.8	201.3	.500
.600	201.3	203.8	206.3	208.7	211.2	213.7	216.1	218.6	221.0	223.5	225.9	.600
.700	225.9	228.3	230.7	233.2	235.6	238.0	240.4	242.7	245.1	247.5	249.9	.700
.800	249.9	252.2	254.6	257.0	259.3	261.7	264.0	266.3	268.7	271.0	273.3	.800
.900	273.3	275.6	277.9	280.2	282.5	284.8	287.1	289.4	291.7	294.0	296.3	.900
1.000	296.3	298.5	300.8	303.0	305.3	307.6	309.8	312.1	314.3	316.5	318.8	1.000
1.100	318.8	321.0	323.2	325.4	327.7	329.9	332.1	334.3	336.5	338.7	340.9	1.100
1.200	340.9	343.1	345.3	347.5	349.7	351.9	354.0	356.2	358.4	360.6	362.7	1.200
1.300	362.7	364.9	367.0	369.2	371.4	373.5	375.7	377.8	380.0	382.1	384.2	1.300
1.400	384.2	386.4	388.5	390.6	392.8	394.9	397.0	399.1	401.3	403.4	405.5	1.400
1.500	405.5	407.6	409.7	411.8	414.0	416.1	418.2	420.3	422.4	424.5	426.6	1.500
1.600	426.6	428.7	430.7	432.8	434.9	437.0	439.1	441.2	443.3	445.3	447.4	1.600
1.700	447.4	449.5	451.6	453.7	455.7	457.8	459.9	461.9	464.0	466.1	468.1	1.700
1.800	468.1	470.2	472.2	474.3	476.3	478.4	480.4	482.5	484.5	486.6	488.6	1.800
1.900	488.6	490.6	492.7	494.7	496.7	498.8	500.8	502.8	504.9	506.9	508.9	1.900
2.000	508.9	510.9	512.9	515.0	517.0	519.0	521.0	523.0	525.0	527.0	529.0	2.000
2.100	529.0	531.0	533.0	535.0	537.0	539.0	541.0	543.0	545.0	547.0	549.0	2.100
2.200	549.0	551.0	553.0	555.0	557.0	558.9	560.9	562.9	564.9	566.9	568.8	2.200
2.300	568.8	570.8	572.8	574.8	576.7	578.7	580.7	582.6	584.6	586.6	588.5	2.300
2.400	588.5	590.5	592.5	594.4	596.4	598.3	600.3	602.3	604.2	606.2	608.1	2.400
2.500	608.1	610.1	612.0	614.0	615.9	617.9	619.8	621.7	623.7	625.6	627.6	2.500
2.600	627.6	629.5	631.5	633.4	635.3	637.3	639.2	641.1	643.1	645.0	646.9	2.600
2.700	646.9	648.9	650.8	652.7	654.6	656.6	658.5	660.4	662.3	664.3	666.2	2.700
2.800	666.2	668.1	670.0	671.9	673.9	675.8	677.7	679.6	681.5	683.4	685.3	2.800
2.900	685.3	687.3	689.2	691.1	693.0	694.9	696.8	698.7	700.6	702.5	704.4	2.900
3.000	704.4	706.3	708.2	710.1	712.0	713.9	715.8	717.7	719.6	721.5	723.4	3.000
3.100	723.4	725.3	727.2	729.1	731.0	732.9	734.8	736.7	738.6	740.5	742.4	3.100
3.200	742.4	744.3	746.1	748.0	749.9	751.8	753.7	755.6	757.5	759.3	761.2	3.200
3.300	761.2	763.1	765.0	766.9	768.8	770.6	772.5	774.4	776.3	778.2	780.0	3.300
3.400	780.0	781.9	783.8	785.7	787.5	789.4	791.3	793.2	795.1	796.9	798.8	3.400
3.500	798.8	800.7	802.5	804.4	806.3	808.2	810.0	811.9	813.8	815.6	817.5	3.500
3.600	817.5	819.3	821.2	823.1	824.9	826.8	828.7	830.5	832.4	834.2	836.1	3.600
3.700	836.1	838.0	839.8	841.7	843.5	845.4	847.2	849.1	851.0	852.8	854.7	3.700
3.800	854.7	856.5	858.4	860.2	862.1	863.9	865.8	867.6	869.5	871.3	873.1	3.800
3.900	873.1	875.0	876.8	878.7	880.5	882.4	884.2	886.1	887.9	889.7	891.6	3.900
4.000	891.6	893.4	895.3	897.1	898.9	900.8	902.6	904.4	906.3	908.1	909.9	4.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
4.000	891.6	893.4	895.3	897.1	898.9	900.8	902.6	904.4	906.3	908.1	909.9	4.000
4.100	909.9	911.8	913.6	915.4	917.3	919.1	920.9	922.8	924.6	926.4	928.2	4.100
4.200	928.2	930.1	931.9	933.7	935.5	937.4	939.2	941.0	942.8	944.6	946.5	4.200
4.300	946.5	948.3	950.1	951.9	953.7	955.6	957.4	959.2	961.0	962.8	964.6	4.300
4.400	964.6	966.5	968.3	970.1	971.9	973.7	975.5	977.3	979.1	980.9	982.7	4.400
4.500	982.7	984.6	986.4	988.2	990.0	991.8	993.6	995.4	997.2	999.0	1000.8	4.500
4.600	1000.8	1002.6	1004.4	1006.2	1008.0	1009.8	1011.6	1013.4	1015.2	1017.0	1018.8	4.600
4.700	1018.8	1020.6	1022.4	1024.2	1026.0	1027.8	1029.5	1031.3	1033.1	1034.9	1036.7	4.700
4.800	1036.7	1038.5	1040.3	1042.1	1043.9	1045.6	1047.4	1049.2	1051.0	1052.8	1054.6	4.800
4.900	1054.6	1056.3	1058.1	1059.9	1061.7	1063.5	1065.3	1067.0	1068.8	1070.6	1072.4	4.900
5.000	1072.4	1074.1	1075.9	1077.7	1079.5	1081.3	1083.1	1084.8	1086.6	1088.3	1090.1	5.000
5.100	1090.1	1091.9	1093.7	1095.4	1097.2	1099.0	1100.7	1102.5	1104.3	1106.0	1107.8	5.100
5.200	1107.8	1109.6	1111.3	1113.1	1114.9	1116.6	1118.4	1120.1	1121.9	1123.7	1125.4	5.200
5.300	1125.4	1127.2	1128.9	1130.7	1132.5	1134.2	1136.0	1137.7	1139.5	1141.2	1143.0	5.300
5.400	1143.0	1144.7	1146.5	1148.3	1150.0	1151.8	1153.5	1155.3	1157.0	1158.7	1160.5	5.400
5.500	1160.5	1162.2	1164.0	1165.7	1167.5	1169.2	1171.0	1172.7	1174.5	1176.2	1177.9	5.500
5.600	1177.9	1179.7	1181.4	1183.2	1184.9	1186.7	1188.4	1190.2	1191.9	1193.6	1195.4	5.600
5.700	1195.4	1197.1	1198.9	1200.6	1202.4	1204.1	1205.8	1207.6	1209.3	1211.0	1212.8	5.700
5.800	1212.8	1214.5	1216.2	1218.0	1219.7	1221.4	1223.2	1224.9	1226.6	1228.4	1230.1	5.800
5.900	1230.1	1231.9	1233.6	1235.3	1237.0	1238.8	1240.5	1242.2	1243.9	1245.7	1247.4	5.900
6.000	1247.4	1249.1	1250.8	1252.6	1254.3	1256.0	1257.7	1259.4	1261.2	1262.9	1264.6	6.000
6.100	1264.6	1266.3	1268.0	1269.8	1271.5	1273.2	1274.9	1276.6	1278.3	1280.1	1281.8	6.100
6.200	1281.8	1283.5	1285.2	1286.9	1288.6	1290.3	1292.0	1293.8	1295.5	1297.2	1298.9	6.200
6.300	1298.9	1300.6	1302.3	1304.0	1305.7	1307.4	1309.1	1310.8	1312.5	1314.2	1315.9	6.300
6.400	1315.9	1317.6	1319.3	1321.0	1322.7	1324.4	1326.2	1327.9	1329.6	1331.3	1333.0	6.400
6.500	1333.0	1334.7	1336.4	1338.0	1339.7	1341.4	1343.1	1344.8	1346.5	1348.2	1349.9	6.500
6.600	1349.9	1351.6	1353.3	1355.0	1356.7	1358.4	1360.1	1361.8	1363.4	1365.1	1366.8	6.600
6.700	1366.8	1368.5	1370.2	1371.9	1373.6	1375.3	1376.9	1378.6	1380.3	1382.0	1383.7	6.700
6.800	1383.7	1385.4	1387.0	1388.7	1390.4	1392.1	1393.8	1395.4	1397.1	1398.8	1400.5	6.800
6.900	1400.5	1402.2	1403.8	1405.5	1407.2	1408.9	1410.5	1412.2	1413.9	1415.6	1417.2	6.900
7.000	1417.2	1418.9	1420.6	1422.2	1423.9	1425.6	1427.3	1428.9	1430.6	1432.3	1433.9	7.000
7.100	1433.9	1435.6	1437.3	1438.9	1440.6	1442.3	1443.9	1445.6	1447.3	1448.9	1450.6	7.100
7.200	1450.6	1452.3	1453.9	1455.6	1457.3	1458.9	1460.6	1462.2	1463.9	1465.5	1467.2	7.200
7.300	1467.2	1468.9	1470.5	1472.2	1473.8	1475.5	1477.1	1478.8	1480.5	1482.1	1483.8	7.300
7.400	1483.8	1485.4	1487.1	1488.7	1490.4	1492.0	1493.7	1495.3	1497.0	1498.6	1500.3	7.400
7.500	1500.3	1501.9	1503.6	1505.2	1506.9	1508.5	1510.2	1511.8	1513.5	1515.1	1516.7	7.500
7.600	1516.7	1518.4	1520.0	1521.7	1523.3	1525.0	1526.6	1528.2	1529.9	1531.5	1533.2	7.600
7.700	1533.2	1534.8	1536.4	1538.1	1539.7	1541.3	1543.0	1544.6	1546.3	1547.9	1549.5	7.700
7.800	1549.5	1551.2	1552.8	1554.4	1556.1	1557.7	1559.3	1561.0	1562.6	1564.2	1565.9	7.800
7.900	1565.9	1567.5	1569.1	1570.7	1572.4	1574.0	1575.6	1577.3	1578.9	1580.5	1582.1	7.900
8.000	1582.1	1583.8	1585.4	1587.0	1588.6	1590.3	1591.9	1593.5	1595.1	1596.7	1598.4	8.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
8.000	1582.1	1583.8	1585.4	1587.0	1588.6	1590.3	1591.9	1593.5	1595.1	1596.7	1598.4	8.000
8.100	1598.4	1600.0	1601.6	1603.2	1604.8	1606.5	1608.1	1609.7	1611.3	1612.9	1614.6	8.100
8.200	1614.6	1616.2	1617.8	1619.4	1621.0	1622.6	1624.2	1625.9	1627.5	1629.1	1630.7	8.200
8.300	1630.7	1632.3	1633.9	1635.5	1637.1	1638.8	1640.4	1642.0	1643.6	1645.2	1646.8	8.300
8.400	1646.8	1648.4	1650.0	1651.6	1653.2	1654.8	1656.4	1658.0	1659.7	1661.3	1662.9	8.400
8.500	1662.9	1664.5	1666.1	1667.7	1669.3	1670.9	1672.5	1674.1	1675.7	1677.3	1678.9	8.500
8.600	1678.9	1680.5	1682.1	1683.7	1685.3	1686.9	1688.4	1690.0	1691.6	1693.2	1694.8	8.600
8.700	1694.8	1696.4	1698.0	1699.6	1701.2	1702.8	1704.4	1706.0	1707.6	1709.2	1710.8	8.700
8.800	1710.8	1712.3	1713.9	1715.5	1717.1	1718.7	1720.3	1721.9	1723.5	1725.1	1726.6	8.800
8.900	1726.6	1728.2	1729.8	1731.4	1733.0	1734.6	1736.2	1737.7	1739.3	1740.9	1742.5	8.900
9.000	1742.5	1744.1	1745.6	1747.2	1748.8	1750.4	1752.0	1753.5	1755.1	1756.7	1758.3	9.000
9.100	1758.3	1759.9	1761.4	1763.0	1764.6	1766.2	1767.7	1769.3	1770.9	1772.5	1774.0	9.100
9.200	1774.0	1775.6	1777.2	1778.8	1780.3	1781.9	1783.5	1785.0	1786.6	1788.2	1789.8	9.200
9.300	1789.8	1791.3	1792.9	1794.5	1796.0	1797.6	1799.2	1800.7	1802.3	1803.9	1805.4	9.300
9.400	1805.4	1807.0	1808.6	1810.1	1811.7	1813.3	1814.8	1816.4	1817.9	1819.5	1821.1	9.400
9.500	1821.1	1822.6	1824.2	1825.8	1827.2	1828.9	1830.4	1832.0	1833.5	1835.1	1836.7	9.500
9.600	1836.7	1838.2	1839.8	1841.3	1842.9	1844.4	1846.0	1847.6	1849.1	1850.7	1852.2	9.600
9.700	1852.2	1853.8	1855.3	1856.9	1858.4	1860.0	1861.5	1863.1	1864.6	1866.2	1867.7	9.700
9.800	1867.7	1869.3	1870.8	1872.4	1873.9	1875.5	1877.0	1878.6	1880.1	1881.7	1883.2	9.800
9.900	1883.2	1884.8	1886.3	1887.8	1889.4	1890.9	1892.5	1894.0	1895.6	1897.1	1898.7	9.900
10.000	1898.7	1900.2	1901.8	1903.3	1904.9	1906.4	1907.9	1909.4	1911.0	1912.5	1914.1	10.000
10.100	1914.1	1915.6	1917.2	1918.7	1920.2	1921.7	1923.3	1924.8	1926.4	1927.9	1929.4	10.100
10.200	1929.4	1930.9	1932.5	1934.0	1935.6	1937.1	1938.6	1940.1	1941.7	1943.2	1944.8	10.200
10.300	1944.8	1946.3	1947.8	1949.4	1950.9	1952.4	1953.9	1955.4	1957.0	1958.5	1960.0	10.300
10.400	1960.0	1961.5	1963.1	1964.6	1966.1	1967.7	1969.2	1970.7	1972.2	1973.8	1975.3	10.400
10.500	1975.3	1976.8	1978.3	1979.9	1981.4	1982.9	1984.4	1985.9	1987.5	1989.0	1990.5	10.500
10.600	1990.5	1992.0	1993.6	1995.1	1996.6	1998.1	1999.6	2001.2	2002.7	2004.2	2005.7	10.600
10.700	2005.7	2007.2	2008.8	2010.3	2011.8	2013.3	2014.8	2016.4	2017.9	2019.4	2020.9	10.700
10.800	2020.9	2022.4	2023.9	2025.5	2027.0	2028.5	2030.0	2031.5	2033.0	2034.6	2036.1	10.800
10.900	2036.1	2037.6	2039.1	2040.6	2042.1	2043.7	2045.2	2046.7	2048.2	2049.7	2051.2	10.900
11.000	2051.2	2052.7	2054.2	2055.8	2057.3	2058.8	2060.3	2061.8	2063.3	2064.8	2066.3	11.000
11.100	2066.3	2067.9	2069.4	2070.9	2072.4	2073.9	2075.4	2076.9	2078.4	2079.9	2081.4	11.100
11.200	2081.4	2083.0	2084.5	2086.0	2087.5	2089.0	2090.5	2092.0	2093.5	2095.0	2096.5	11.200
11.300	2096.5	2098.0	2099.5	2101.1	2102.6	2104.1	2105.6	2107.1	2108.6	2110.1	2111.6	11.300
11.400	2111.6	2113.1	2114.6	2116.1	2117.6	2119.1	2120.6	2122.1	2123.6	2125.1	2126.6	11.400
11.500	2126.6	2128.2	2129.7	2131.2	2132.7	2134.2	2135.7	2137.2	2138.7	2140.2	2141.7	11.500
11.600	2141.7	2143.2	2144.7	2146.2	2147.7	2149.2	2150.7	2152.2	2153.7	2155.2	2156.7	11.600
11.700	2156.7	2158.2	2159.7	2161.2	2162.7	2164.2	2165.7	2167.2	2168.7	2170.2	2171.7	11.700
11.800	2171.7	2173.2	2174.7	2176.2	2177.7	2179.2	2180.7	2182.2	2183.7	2185.2	2186.7	11.800
11.900	2186.7	2188.2	2189.7	2191.2	2192.7	2194.2	2195.7	2197.2	2198.7	2200.2	2201.7	11.900
12.000	2201.7	2203.2	2204.7	2206.2	2207.7	2209.2	2210.7	2212.2	2213.7	2215.2	2216.7	12.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
12. 000	2201. 7	2203. 2	2204. 7	2206. 2	2207. 7	2209. 2	2210. 7	2212. 2	2213. 7	2215. 2	2216. 7	12. 000
12. 100	2216. 7	2218. 2	2219. 7	2221. 2	2222. 7	2224. 2	2225. 7	2227. 2	2228. 7	2230. 2	2231. 7	12. 100
12. 200	2231. 7	2233. 2	2234. 7	2236. 2	2237. 7	2239. 2	2240. 7	2242. 2	2243. 6	2245. 1	2246. 6	12. 200
12. 300	2246. 6	2248. 1	2249. 6	2251. 1	2252. 6	2254. 1	2255. 6	2257. 1	2258. 6	2260. 1	2261. 6	12. 300
12. 400	2261. 6	2263. 1	2264. 6	2266. 1	2267. 6	2269. 1	2270. 6	2272. 1	2273. 6	2275. 1	2276. 6	12. 400
12. 500	2276. 6	2278. 1	2279. 5	2281. 0	2282. 5	2284. 0	2285. 5	2287. 0	2288. 5	2290. 0	2291. 5	12. 500
12. 600	2291. 5	2293. 0	2294. 5	2296. 0	2297. 5	2299. 0	2300. 5	2302. 0	2303. 5	2305. 0	2306. 5	12. 600
12. 700	2306. 5	2308. 0	2309. 5	2311. 0	2312. 5	2314. 0	2315. 4	2316. 9	2318. 4	2319. 9	2321. 4	12. 700
12. 800	2321. 4	2322. 9	2324. 4	2325. 9	2327. 4	2328. 9	2330. 4	2331. 9	2333. 4	2334. 9	2336. 4	12. 800
12. 900	2336. 4	2337. 9	2339. 4	2340. 9	2342. 4	2343. 9	2345. 4	2346. 9	2348. 4	2349. 9	2351. 4	12. 900
13. 000	2351. 4	2352. 9	2354. 4	2355. 9	2357. 4	2358. 9	2360. 4	2361. 9	2363. 4	2364. 9	2366. 4	13. 000
13. 100	2366. 4	2367. 8	2369. 3	2370. 8	2372. 3	2373. 8	2375. 3	2376. 8	2378. 3	2379. 8	2381. 3	13. 100
13. 200	2381. 3	2382. 8	2384. 3	2385. 8	2387. 3	2388. 8	2390. 3	2391. 8	2393. 3	2394. 8	2396. 3	13. 200
13. 300	2396. 3	2397. 8	2399. 3	2400. 8	2402. 3	2403. 8	2405. 3	2406. 8	2408. 3	2409. 8	2411. 3	13. 300
13. 400	2411. 3	2412. 8	2414. 3	2415. 8	2417. 3	2418. 8	2420. 3	2421. 8	2423. 3	2424. 8	2426. 3	13. 400
13. 500	2426. 3	2427. 8	2429. 3	2430. 8	2432. 3	2433. 8	2435. 3	2436. 8	2438. 3	2439. 8	2441. 3	13. 500
13. 600	2441. 3	2442. 8	2444. 3	2445. 8	2447. 3	2448. 8	2450. 3	2451. 8	2453. 3	2454. 8	2456. 3	13. 600
13. 700	2456. 3	2457. 8	2459. 3	2460. 8	2462. 3	2463. 8	2465. 3	2466. 8	2468. 3	2469. 8	2471. 3	13. 700
13. 800	2471. 3	2472. 8	2474. 3	2475. 8	2477. 3	2478. 8	2480. 3	2481. 8	2483. 3	2484. 8	2486. 3	13. 800
13. 900	2486. 3	2487. 8	2489. 3	2490. 8	2492. 3	2493. 8	2495. 3	2496. 8	2498. 3	2499. 8	2501. 3	13. 900
14. 000	2501. 3	2502. 8	2504. 3	2505. 8	2507. 4	2508. 9	2510. 4	2511. 9	2513. 4	2514. 9	2516. 4	14. 000
14. 100	2516. 4	2517. 9	2519. 4	2520. 9	2522. 4	2523. 9	2525. 4	2526. 9	2528. 4	2529. 9	2531. 4	14. 100
14. 200	2531. 4	2532. 9	2534. 4	2535. 9	2537. 4	2538. 9	2540. 4	2541. 9	2543. 4	2544. 9	2546. 4	14. 200
14. 300	2546. 4	2547. 9	2549. 4	2550. 9	2552. 4	2554. 0	2555. 5	2557. 0	2558. 5	2560. 0	2561. 5	14. 300
14. 400	2561. 5	2563. 0	2564. 5	2566. 0	2567. 5	2569. 0	2570. 5	2572. 0	2573. 5	2575. 0	2576. 5	14. 400
14. 500	2576. 5	2578. 0	2579. 5	2581. 0	2582. 5	2584. 1	2585. 6	2587. 1	2588. 6	2590. 1	2591. 6	14. 500
14. 600	2591. 6	2593. 1	2594. 6	2596. 1	2597. 6	2599. 1	2600. 6	2602. 1	2603. 6	2605. 1	2606. 6	14. 600
14. 700	2606. 6	2608. 1	2609. 7	2611. 2	2612. 7	2614. 2	2615. 7	2617. 2	2618. 7	2620. 2	2621. 7	14. 700
14. 800	2621. 7	2623. 2	2624. 7	2626. 2	2627. 7	2629. 3	2630. 8	2632. 3	2633. 8	2635. 3	2636. 8	14. 800
14. 900	2636. 8	2638. 3	2639. 8	2641. 3	2642. 8	2644. 3	2645. 8	2647. 4	2648. 9	2650. 4	2651. 9	14. 900
15. 000	2651. 9	2653. 4	2654. 9	2656. 4	2657. 9	2659. 4	2660. 9	2662. 4	2664. 0	2665. 5	2667. 0	15. 000
15. 100	2667. 0	2668. 5	2670. 0	2671. 5	2673. 0	2674. 5	2676. 0	2677. 5	2679. 0	2680. 6	2682. 1	15. 100
15. 200	2682. 1	2683. 6	2685. 1	2686. 6	2688. 1	2689. 6	2691. 1	2692. 6	2694. 2	2695. 7	2697. 2	15. 200
15. 300	2697. 2	2698. 7	2700. 2	2701. 7	2703. 2	2704. 7	2706. 2	2707. 8	2709. 3	2710. 8	2712. 3	15. 300
15. 400	2712. 3	2713. 8	2715. 3	2716. 8	2718. 3	2719. 9	2721. 4	2722. 9	2724. 4	2725. 9	2727. 4	15. 400
15. 500	2727. 4	2728. 9	2730. 4	2732. 0	2733. 5	2735. 0	2736. 5	2738. 0	2739. 5	2741. 0	2742. 5	15. 500
15. 600	2742. 5	2744. 1	2745. 6	2747. 1	2748. 6	2750. 1	2751. 6	2753. 1	2754. 7	2756. 2	2757. 7	15. 600
15. 700	2757. 7	2759. 2	2760. 7	2762. 2	2763. 7	2765. 3	2766. 8	2768. 3	2769. 8	2771. 3	2772. 8	15. 700
15. 800	2772. 8	2774. 4	2775. 9	2777. 4	2778. 9	2780. 4	2781. 9	2783. 5	2785. 0	2786. 5	2788. 0	15. 800
15. 900	2788. 0	2789. 5	2791. 0	2792. 5	2794. 1	2795. 6	2797. 1	2798. 6	2800. 1	2801. 6	2803. 2	15. 900
16. 000	2803. 2	2804. 7	2806. 2	2807. 7	2809. 2	2810. 8	2812. 3	2813. 8	2815. 3	2816. 8	2818. 3	16. 000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 12. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
16. 000	2803. 2	2804. 7	2806. 2	2807. 7	2809. 2	2810. 8	2812. 3	2813. 8	2815. 3	2816. 8	2818. 3	16. 000
16. 100	2818. 3	2819. 9	2821. 4	2822. 9	2824. 4	2825. 9	2827. 5	2829. 0	2830. 5	2832. 0	2833. 5	16. 100
16. 200	2833. 5	2835. 1	2836. 6	2838. 1	2839. 6	2841. 1	2842. 6	2844. 2	2845. 7	2847. 2	2848. 7	16. 200
16. 300	2848. 7	2850. 2	2851. 8	2853. 3	2854. 8	2856. 3	2857. 8	2859. 4	2860. 9	2862. 4	2863. 9	16. 300
16. 400	2863. 9	2865. 5	2867. 0	2868. 5	2870. 0	2871. 5	2873. 1	2874. 6	2876. 1	2877. 6	2879. 2	16. 400
16. 500	2879. 2	2880. 7	2882. 2	2883. 7	2885. 2	2886. 8	2888. 3	2889. 8	2891. 3	2892. 9	2894. 4	16. 500
16. 600	2894. 4	2895. 9	2897. 4	2899. 0	2900. 5	2902. 0	2903. 5	2905. 1	2906. 6	2908. 1	2909. 6	16. 600
16. 700	2909. 6	2911. 2	2912. 7	2914. 2	2915. 7	2917. 3	2918. 8	2920. 3	2921. 8	2923. 4	2924. 9	16. 700
16. 800	2924. 9	2926. 4	2927. 9	2929. 5	2931. 0	2932. 5	2934. 0	2935. 6	2937. 1	2938. 6	2940. 1	16. 800
16. 900	2940. 1	2941. 7	2943. 2	2944. 7	2946. 2	2947. 8	2949. 3	2950. 8	2952. 4	2953. 9	2955. 4	16. 900
17. 000	2955. 4	2956. 9	2958. 5	2960. 0	2961. 5	2963. 1	2964. 6	2966. 1	2967. 6	2969. 2	2970. 7	17. 000
17. 100	2970. 7	2972. 2	2973. 8	2975. 3	2976. 8	2978. 3	2979. 9	2981. 4	2982. 9	2984. 5	2986. 0	17. 100
17. 200	2986. 0	2987. 5	2989. 1	2990. 6	2992. 1	2993. 6	2995. 2	2996. 7	2998. 2	2999. 8	3001. 3	17. 200
17. 300	3001. 3	3002. 8	3004. 4	3005. 9	3007. 4	3009. 0	3010. 5	3012. 0	3013. 6	3015. 1	3016. 6	17. 300
17. 400	3016. 6	3018. 2	3019. 7	3021. 2	3022. 8	3024. 3	3025. 8	3027. 4	3028. 9	3030. 4	3032. 0	17. 400
17. 500	3032. 0	3033. 5	3035. 0	3036. 6	3038. 1	3039. 6	3041. 2	3042. 7	3044. 2	3045. 8	3047. 3	17. 500
17. 600	3047. 3	3048. 8	3050. 4	3051. 9	3053. 4	3055. 0	3056. 5	3058. 1	3059. 6	3061. 1	3062. 7	17. 600
17. 700	3062. 7	3064. 2	3065. 7	3067. 3	3068. 8	3070. 3	3071. 9	3073. 4	3075. 0	3076. 5	3078. 0	17. 700
17. 800	3078. 0	3079. 6	3081. 1	3082. 6	3084. 2	3085. 7	3087. 3	3088. 8	3090. 3	3091. 9	3093. 4	17. 800
17. 900	3093. 4	3095. 0	3096. 5	3098. 0	3099. 6	3101. 1	3102. 7	3104. 2	3105. 7	3107. 3	3108. 8	17. 900
18. 000	3108. 8	3110. 4	3111. 9	3113. 4	3115. 0	3116. 5	3118. 1	3119. 6	3121. 1	3122. 7	3124. 2	18. 000
18. 100	3124. 2	3125. 8	3127. 3	3128. 9	3130. 4	3131. 9	3133. 5	3135. 0	3136. 6	3138. 1	3139. 7	18. 100
18. 200	3139. 7	3141. 2	3142. 7	3144. 3	3145. 8	3147. 4	3148. 9	3150. 5	3152. 0	3153. 6	3155. 1	18. 200
18. 300	3155. 1	3156. 6	3158. 2	3159. 7	3161. 3	3162. 8	3164. 4	3165. 9	3167. 5	3169. 0	3170. 6	18. 300
18. 400	3170. 6	3172. 1	3173. 7	3175. 2	3176. 7	3178. 3	3179. 8	3181. 4	3182. 9	3184. 5	3186. 0	18. 400
18. 500	3186. 0	3187. 6	3189. 1	3190. 7	3192. 2	3193. 8	3195. 3	3196. 9	3198. 4	3200. 0	3201. 5	18. 500
18. 600	3201. 5	3203. 1	3204. 6	3206. 2	3207. 7	3209. 3	3210. 8	3212. 4	3213. 9	3215. 5	-----	18. 600
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

# Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
30	-----	-----	0.000	0.003	0.006	0.009	0.012	0.015	0.018	0.021	0.024	30
40	0.024	0.028	.031	.034	.037	.040	.043	.046	.049	.052	.056	40
50	.056	.059	.062	.065	.068	.071	.075	.078	.081	.084	.087	50
60	.087	.091	.094	.097	.100	.104	.107	.110	.113	.117	.120	60
70	.120	.123	.126	.130	.133	.136	.140	.143	.146	.150	.153	70
80	.153	.156	.160	.163	.166	.170	.173	.176	.180	.183	.187	80
90	.187	.190	.193	.197	.200	.204	.207	.211	.214	.218	.221	90
100	.221	.224	.228	.231	.235	.238	.242	.245	.249	.252	.256	100
110	.256	.259	.263	.266	.270	.274	.277	.281	.284	.288	.291	110
120	.291	.295	.299	.302	.306	.309	.313	.317	.320	.324	.327	120
130	.327	.331	.335	.338	.342	.346	.349	.353	.357	.360	.364	130
140	.364	.368	.371	.375	.379	.383	.386	.390	.394	.397	.401	140
150	.401	.405	.409	.412	.416	.420	.424	.428	.431	.435	.439	150
160	.439	.443	.447	.450	.454	.458	.462	.466	.469	.473	.477	160
170	.477	.481	.485	.489	.493	.496	.500	.504	.508	.512	.516	170
180	.516	.520	.524	.528	.532	.535	.539	.543	.547	.551	.555	180
190	.555	.559	.563	.567	.571	.575	.579	.583	.587	.591	.595	190
200	.595	.599	.603	.607	.611	.615	.619	.623	.627	.631	.635	200
210	.635	.639	.643	.647	.651	.655	.659	.664	.668	.672	.676	210
220	.676	.680	.684	.688	.692	.696	.700	.705	.709	.713	.717	220
230	.717	.721	.725	.729	.734	.738	.742	.746	.750	.754	.758	230
240	.758	.763	.767	.771	.775	.779	.784	.788	.792	.796	.800	240
250	.800	.805	.809	.813	.817	.822	.826	.830	.834	.839	.843	250
260	.843	.847	.851	.856	.860	.864	.869	.873	.877	.881	.886	260
270	.886	.890	.894	.899	.903	.907	.912	.916	.920	.925	.929	270
280	.929	.933	.938	.942	.946	.951	.955	.959	.964	.968	.973	280
290	.973	.977	.981	.986	.990	.994	.999	1.003	1.008	1.012	1.017	290
300	1.017	1.021	1.025	1.030	1.034	1.039	1.043	1.048	1.052	1.056	1.061	300
310	1.061	1.065	1.070	1.074	1.079	1.083	1.088	1.092	1.097	1.101	1.106	310
320	1.106	1.110	1.115	1.119	1.124	1.128	1.132	1.137	1.142	1.146	1.151	320
330	1.151	1.155	1.160	1.164	1.169	1.173	1.178	1.182	1.187	1.191	1.196	330
340	1.196	1.200	1.205	1.210	1.214	1.219	1.223	1.228	1.232	1.237	1.242	340
350	1.242	1.246	1.251	1.255	1.260	1.264	1.269	1.274	1.278	1.283	1.287	350
360	1.287	1.292	1.297	1.301	1.306	1.311	1.315	1.320	1.324	1.329	1.334	360
370	1.334	1.338	1.343	1.348	1.352	1.357	1.362	1.366	1.371	1.376	1.380	370
380	1.380	1.385	1.390	1.394	1.399	1.404	1.408	1.413	1.418	1.422	1.427	380
390	1.427	1.432	1.436	1.441	1.446	1.450	1.455	1.460	1.465	1.469	1.474	390
400	1.474	1.479	1.483	1.488	1.493	1.498	1.502	1.507	1.512	1.516	1.521	400
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.



**Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
400	1.474	1.479	1.483	1.488	1.493	1.498	1.502	1.507	1.512	1.516	1.521	400
410	1.521	1.526	1.531	1.535	1.540	1.545	1.550	1.554	1.559	1.564	1.569	410
420	1.569	1.573	1.578	1.583	1.588	1.593	1.597	1.602	1.607	1.612	1.616	420
430	1.616	1.621	1.626	1.631	1.636	1.640	1.645	1.650	1.655	1.660	1.664	430
440	1.664	1.669	1.674	1.679	1.684	1.688	1.693	1.698	1.703	1.708	1.712	440
450	1.712	1.717	1.722	1.727	1.732	1.736	1.741	1.746	1.751	1.756	1.761	450
460	1.761	1.765	1.770	1.775	1.780	1.785	1.790	1.795	1.799	1.804	1.809	460
470	1.809	1.814	1.819	1.824	1.829	1.833	1.838	1.843	1.848	1.853	1.858	470
480	1.858	1.863	1.868	1.873	1.877	1.882	1.887	1.892	1.897	1.902	1.907	480
490	1.907	1.912	1.917	1.922	1.927	1.931	1.936	1.941	1.946	1.951	1.956	490
500	1.956	1.961	1.966	1.971	1.976	1.981	1.986	1.991	1.996	2.000	2.005	500
510	2.005	2.010	2.015	2.020	2.025	2.030	2.035	2.040	2.045	2.050	2.055	510
520	2.055	2.060	2.065	2.070	2.075	2.080	2.085	2.090	2.095	2.100	2.105	520
530	2.105	2.110	2.115	2.120	2.125	2.130	2.135	2.140	2.145	2.150	2.155	530
540	2.155	2.160	2.165	2.170	2.175	2.180	2.185	2.190	2.195	2.200	2.205	540
550	2.205	2.210	2.215	2.220	2.225	2.230	2.235	2.240	2.245	2.250	2.255	550
560	2.255	2.260	2.265	2.270	2.276	2.281	2.286	2.291	2.296	2.301	2.306	560
570	2.306	2.311	2.316	2.321	2.326	2.331	2.336	2.341	2.346	2.351	2.357	570
580	2.357	2.362	2.367	2.372	2.377	2.382	2.387	2.392	2.397	2.402	2.407	580
590	2.407	2.413	2.418	2.423	2.428	2.433	2.438	2.443	2.448	2.453	2.458	590
600	2.458	2.464	2.469	2.474	2.479	2.484	2.489	2.494	2.499	2.505	2.510	600
610	2.510	2.515	2.520	2.525	2.530	2.535	2.540	2.546	2.551	2.556	2.561	610
620	2.561	2.566	2.571	2.576	2.582	2.587	2.592	2.597	2.602	2.607	2.613	620
630	2.613	2.618	2.623	2.628	2.633	2.638	2.644	2.649	2.654	2.659	2.664	630
640	2.664	2.669	2.675	2.680	2.685	2.690	2.695	2.700	2.706	2.711	2.716	640
650	2.716	2.721	2.726	2.731	2.737	2.742	2.747	2.752	2.757	2.763	2.768	650
660	2.768	2.773	2.778	2.783	2.789	2.794	2.799	2.804	2.809	2.815	2.820	660
670	2.820	2.825	2.830	2.836	2.841	2.846	2.851	2.856	2.862	2.867	2.872	670
680	2.872	2.877	2.882	2.888	2.893	2.898	2.903	2.909	2.914	2.919	2.924	680
690	2.924	2.930	2.935	2.940	2.945	2.951	2.956	2.961	2.966	2.972	2.977	690
700	2.977	2.982	2.987	2.992	2.998	3.003	3.008	3.014	3.019	3.024	3.029	700
710	3.029	3.035	3.040	3.045	3.050	3.056	3.061	3.066	3.071	3.077	3.082	710
720	3.082	3.087	3.092	3.098	3.102	3.108	3.114	3.119	3.124	3.129	3.135	720
730	3.135	3.140	3.145	3.150	3.156	3.161	3.166	3.172	3.177	3.182	3.188	730
740	3.188	3.193	3.198	3.203	3.209	3.214	3.219	3.225	3.230	3.235	3.240	740
750	3.240	3.246	3.251	3.256	3.262	3.267	3.272	3.278	3.283	3.288	3.293	750
760	3.293	3.299	3.304	3.309	3.315	3.320	3.325	3.331	3.336	3.341	3.347	760
770	3.347	3.352	3.357	3.363	3.368	3.373	3.378	3.384	3.389	3.394	3.400	770
780	3.400	3.405	3.410	3.416	3.421	3.426	3.432	3.437	3.442	3.448	3.453	780
790	3.453	3.458	3.464	3.469	3.474	3.480	3.485	3.490	3.496	3.501	3.506	790
800	3.506	3.512	3.517	3.522	3.528	3.533	3.539	3.544	3.549	3.555	3.560	800
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
800	3.506	3.512	3.517	3.522	3.528	3.533	3.539	3.544	3.549	3.555	3.560	800
810	3.560	3.565	3.571	3.576	3.581	3.587	3.592	3.597	3.603	3.608	3.614	810
820	3.614	3.619	3.624	3.630	3.635	3.640	3.646	3.651	3.656	3.662	3.667	820
830	3.667	3.673	3.678	3.683	3.689	3.694	3.699	3.705	3.710	3.716	3.721	830
840	3.721	3.726	3.732	3.737	3.743	3.748	3.753	3.759	3.764	3.769	3.775	840
850	3.775	3.780	3.786	3.791	3.796	3.802	3.807	3.813	3.818	3.823	3.829	850
860	3.829	3.834	3.840	3.845	3.850	3.856	3.861	3.867	3.872	3.878	3.88	860
870	3.883	3.888	3.894	3.899	3.905	3.910	3.915	3.921	3.926	3.932	3.937	870
880	3.937	3.943	3.948	3.953	3.959	3.964	3.970	3.975	3.981	3.986	3.991	880
890	3.991	3.997	4.002	4.008	4.013	4.019	4.024	4.030	4.035	4.040	4.046	890
900	4.046	4.051	4.057	4.062	4.068	4.073	4.079	4.084	4.089	4.095	4.100	900
910	4.100	4.106	4.111	4.117	4.122	4.128	4.133	4.139	4.144	4.149	4.155	910
920	4.155	4.160	4.166	4.171	4.177	4.182	4.188	4.193	4.199	4.204	4.210	920
930	4.210	4.215	4.221	4.226	4.232	4.237	4.243	4.248	4.254	4.259	4.264	930
940	4.264	4.270	4.275	4.281	4.286	4.292	4.297	4.303	4.308	4.314	4.319	940
950	4.319	4.325	4.330	4.336	4.341	4.347	4.352	4.358	4.363	4.369	4.374	950
960	4.374	4.380	4.385	4.391	4.396	4.402	4.408	4.413	4.419	4.424	4.430	960
970	4.430	4.435	4.441	4.446	4.452	4.457	4.463	4.468	4.474	4.479	4.485	970
980	4.485	4.490	4.496	4.501	4.507	4.512	4.518	4.524	4.529	4.535	4.540	980
990	4.540	4.546	4.551	4.557	4.562	4.568	4.573	4.579	4.584	4.590	4.596	990
1,000	4.596	4.601	4.607	4.612	4.618	4.623	4.629	4.634	4.640	4.646	4.651	1,000
1,010	4.651	4.657	4.662	4.668	4.673	4.679	4.685	4.690	4.696	4.701	4.707	1,010
1,020	4.707	4.712	4.718	4.724	4.729	4.735	4.740	4.746	4.751	4.757	4.763	1,020
1,030	4.763	4.768	4.774	4.779	4.785	4.790	4.796	4.802	4.807	4.813	4.818	1,030
1,040	4.818	4.824	4.830	4.835	4.841	4.846	4.852	4.858	4.863	4.869	4.874	1,040
1,050	4.874	4.880	4.886	4.891	4.897	4.902	4.908	4.914	4.919	4.925	4.930	1,050
1,060	4.930	4.936	4.942	4.947	4.953	4.959	4.964	4.970	4.975	4.981	4.987	1,060
1,070	4.987	4.992	4.998	5.004	5.009	5.015	5.020	5.026	5.032	5.037	5.043	1,070
1,080	5.043	5.049	5.054	5.060	5.066	5.071	5.077	5.082	5.088	5.094	5.099	1,080
1,090	5.099	5.105	5.111	5.116	5.122	5.128	5.133	5.139	5.145	5.150	5.156	1,090
1,100	5.156	5.162	5.167	5.173	5.178	5.184	5.190	5.195	5.201	5.207	5.212	1,100
1,110	5.212	5.218	5.224	5.229	5.235	5.241	5.246	5.252	5.258	5.264	5.269	1,110
1,120	5.269	5.275	5.281	5.286	5.292	5.298	5.303	5.309	5.315	5.320	5.326	1,120
1,130	5.326	5.332	5.337	5.343	5.349	5.354	5.360	5.366	5.372	5.377	5.383	1,130
1,140	5.383	5.389	5.394	5.400	5.406	5.411	5.417	5.423	5.429	5.434	5.440	1,140
1,150	5.440	5.446	5.451	5.457	5.463	5.469	5.474	5.480	5.486	5.491	5.497	1,150
1,160	5.497	5.503	5.509	5.514	5.520	5.526	5.532	5.537	5.543	5.549	5.555	1,160
1,170	5.555	5.560	5.566	5.572	5.577	5.583	5.589	5.595	5.600	5.606	5.612	1,170
1,180	5.612	5.617	5.623	5.629	5.635	5.640	5.646	5.652	5.658	5.663	5.669	1,180
1,190	5.669	5.675	5.681	5.686	5.692	5.698	5.704	5.709	5.715	5.721	5.726	1,190
1,200	5.726	5.732	5.738	5.744	5.749	5.755	5.761	5.767	5.773	5.778	5.784	1,200
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
Millivolts												
1, 200	5. 726	5. 732	5. 738	5. 744	5. 749	5. 755	5. 761	5. 767	5. 773	5. 778	5. 784	1, 200
1, 210	5. 784	5. 790	5. 796	5. 801	5. 807	5. 813	5. 819	5. 824	5. 830	5. 836	5. 842	1, 210
1, 220	5. 842	5. 847	5. 853	5. 859	5. 865	5. 871	5. 876	5. 882	5. 888	5. 894	5. 899	1, 220
1, 230	5. 899	5. 905	5. 911	5. 917	5. 923	5. 928	5. 934	5. 940	5. 946	5. 951	5. 957	1, 230
1, 240	5. 957	5. 963	5. 969	5. 975	5. 980	5. 986	5. 992	5. 998	6. 004	6. 009	6. 015	1, 240
1, 250	6. 015	6. 021	6. 027	6. 033	6. 038	6. 044	6. 050	6. 056	6. 062	6. 067	6. 073	1, 250
1, 260	6. 073	6. 079	6. 085	6. 091	6. 096	6. 102	6. 108	6. 114	6. 120	6. 126	6. 131	1, 260
1, 270	6. 131	6. 137	6. 143	6. 149	6. 155	6. 161	6. 166	6. 172	6. 178	6. 184	6. 190	1, 270
1, 280	6. 190	6. 196	6. 201	6. 207	6. 213	6. 219	6. 225	6. 231	6. 236	6. 242	6. 248	1, 280
1, 290	6. 248	6. 254	6. 260	6. 266	6. 271	6. 277	6. 283	6. 289	6. 295	6. 301	6. 307	1, 290
1, 300	6. 307	6. 312	6. 318	6. 324	6. 330	6. 336	6. 342	6. 348	6. 353	6. 359	6. 365	1, 300
1, 310	6. 365	6. 371	6. 377	6. 383	6. 389	6. 394	6. 400	6. 406	6. 412	6. 418	6. 424	1, 310
1, 320	6. 424	6. 430	6. 436	6. 441	6. 447	6. 453	6. 459	6. 465	6. 471	6. 477	6. 483	1, 320
1, 330	6. 483	6. 488	6. 494	6. 500	6. 506	6. 512	6. 518	6. 524	6. 530	6. 536	6. 542	1, 330
1, 340	6. 542	6. 547	6. 553	6. 559	6. 565	6. 571	6. 577	6. 583	6. 589	6. 595	6. 601	1, 340
1, 350	6. 601	6. 606	6. 612	6. 618	6. 624	6. 630	6. 636	6. 642	6. 648	6. 654	6. 660	1, 350
1, 360	6. 660	6. 666	6. 671	6. 677	6. 683	6. 689	6. 695	6. 701	6. 707	6. 713	6. 719	1, 360
1, 370	6. 719	6. 725	6. 731	6. 737	6. 743	6. 749	6. 754	6. 760	6. 766	6. 772	6. 778	1, 370
1, 380	6. 778	6. 784	6. 790	6. 796	6. 802	6. 808	6. 814	6. 820	6. 826	6. 832	6. 838	1, 380
1, 390	6. 838	6. 844	6. 850	6. 855	6. 861	6. 867	6. 873	6. 879	6. 885	6. 891	6. 897	1, 390
1, 400	6. 897	6. 903	6. 909	6. 915	6. 921	6. 927	6. 933	6. 939	6. 945	6. 951	6. 957	1, 400
1, 410	6. 957	6. 963	6. 969	6. 975	6. 981	6. 987	6. 993	6. 999	7. 005	7. 011	7. 017	1, 410
1, 420	7. 017	7. 023	7. 029	7. 034	7. 040	7. 046	7. 052	7. 058	7. 064	7. 070	7. 076	1, 420
1, 430	7. 076	7. 082	7. 088	7. 094	7. 100	7. 106	7. 112	7. 118	7. 124	7. 130	7. 136	1, 430
1, 440	7. 136	7. 142	7. 148	7. 154	7. 160	7. 166	7. 172	7. 178	7. 184	7. 190	7. 196	1, 440
1, 450	7. 196	7. 202	7. 208	7. 214	7. 220	7. 226	7. 233	7. 239	7. 245	7. 251	7. 257	1, 450
1, 460	7. 257	7. 263	7. 269	7. 275	7. 281	7. 287	7. 293	7. 299	7. 305	7. 311	7. 317	1, 460
1, 470	7. 317	7. 323	7. 329	7. 335	7. 341	7. 347	7. 353	7. 359	7. 365	7. 371	7. 377	1, 470
1, 480	7. 377	7. 383	7. 389	7. 395	7. 401	7. 407	7. 414	7. 420	7. 426	7. 432	7. 438	1, 480
1, 490	7. 438	7. 444	7. 450	7. 456	7. 462	7. 468	7. 474	7. 480	7. 486	7. 492	7. 498	1, 490
1, 500	7. 498	7. 504	7. 510	7. 517	7. 523	7. 529	7. 535	7. 541	7. 547	7. 553	7. 559	1, 500
1, 510	7. 559	7. 565	7. 571	7. 577	7. 583	7. 589	7. 596	7. 602	7. 608	7. 614	7. 620	1, 510
1, 520	7. 620	7. 626	7. 632	7. 638	7. 644	7. 650	7. 656	7. 662	7. 669	7. 675	7. 681	1, 520
1, 530	7. 681	7. 687	7. 693	7. 699	7. 705	7. 711	7. 717	7. 723	7. 730	7. 736	7. 742	1, 530
1, 540	7. 742	7. 748	7. 754	7. 760	7. 766	7. 772	7. 778	7. 785	7. 791	7. 797	7. 803	1, 540
1, 550	7. 803	7. 809	7. 815	7. 821	7. 827	7. 834	7. 840	7. 846	7. 852	7. 858	7. 864	1, 550
1, 560	7. 864	7. 870	7. 876	7. 882	7. 889	7. 895	7. 901	7. 907	7. 913	7. 919	7. 925	1, 560
1, 570	7. 925	7. 932	7. 938	7. 944	7. 950	7. 956	7. 962	7. 968	7. 975	7. 981	7. 987	1, 570
1, 580	7. 987	7. 993	7. 999	8. 005	8. 012	8. 018	8. 024	8. 030	8. 036	8. 042	8. 048	1, 580
1, 590	8. 048	8. 055	8. 061	8. 067	8. 073	8. 079	8. 085	8. 092	8. 098	8. 104	8. 110	1, 590
1, 600	8. 110	8. 116	8. 122	8. 129	8. 135	8. 141	8. 147	8. 153	8. 159	8. 166	8. 172	1, 600
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.

**Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
1, 600	8. 110	8. 116	8. 122	8. 129	8. 135	8. 141	8. 147	8. 153	8. 159	8. 166	8. 172	1, 600
1, 610	8. 172	8. 178	8. 184	8. 190	8. 197	8. 203	8. 209	8. 215	8. 221	8. 228	8. 234	1, 610
1, 620	8. 234	8. 240	8. 246	8. 252	8. 258	8. 265	8. 271	8. 277	8. 283	8. 289	8. 296	1, 620
1, 630	8. 296	8. 302	8. 308	8. 314	8. 320	8. 327	8. 333	8. 339	8. 345	8. 352	8. 358	1, 630
1, 640	8. 358	8. 364	8. 370	8. 376	8. 383	8. 389	8. 395	8. 401	8. 407	8. 414	8. 420	1, 640
1, 650	8. 420	8. 426	8. 432	8. 439	8. 445	8. 451	8. 457	8. 464	8. 470	8. 476	8. 482	1, 650
1, 660	8. 482	8. 488	8. 495	8. 501	8. 507	8. 513	8. 520	8. 526	8. 532	8. 538	8. 545	1, 660
1, 670	8. 545	8. 551	8. 557	8. 563	8. 570	8. 576	8. 582	8. 588	8. 595	8. 601	8. 607	1, 670
1, 680	8. 607	8. 613	8. 620	8. 626	8. 632	8. 638	8. 645	8. 651	8. 657	8. 663	8. 670	1, 680
1, 690	8. 670	8. 676	8. 682	8. 689	8. 695	8. 701	8. 707	8. 714	8. 720	8. 726	8. 732	1, 690
1, 700	8. 732	8. 739	8. 745	8. 751	8. 758	8. 764	8. 770	8. 776	8. 783	8. 789	8. 795	1, 700
1, 710	8. 795	8. 802	8. 808	8. 814	8. 820	8. 827	8. 833	8. 839	8. 846	8. 852	8. 858	1, 710
1, 720	8. 858	8. 864	8. 871	8. 877	8. 883	8. 890	8. 896	8. 902	8. 909	8. 915	8. 921	1, 720
1, 730	8. 921	8. 927	8. 934	8. 940	8. 946	8. 953	8. 959	8. 965	8. 972	8. 978	8. 984	1, 730
1, 740	8. 984	8. 991	8. 997	9. 003	9. 010	9. 016	9. 022	9. 029	9. 035	9. 041	9. 048	1, 740
1, 750	9. 048	9. 054	9. 060	9. 067	9. 073	9. 079	9. 086	9. 092	9. 098	9. 105	9. 111	1, 750
1, 760	9. 111	9. 117	9. 124	9. 130	9. 136	9. 143	9. 149	9. 155	9. 162	9. 168	9. 174	1, 760
1, 770	9. 174	9. 181	9. 187	9. 193	9. 200	9. 206	9. 212	9. 219	9. 225	9. 232	9. 238	1, 770
1, 780	9. 238	9. 244	9. 251	9. 257	9. 263	9. 270	9. 276	9. 282	9. 289	9. 295	9. 302	1, 780
1, 790	9. 302	9. 308	9. 314	9. 321	9. 327	9. 333	9. 340	9. 346	9. 353	9. 359	9. 365	1, 790
1, 800	9. 365	9. 372	9. 378	9. 384	9. 391	9. 397	9. 404	9. 410	9. 416	9. 423	9. 429	1, 800
1, 810	9. 429	9. 436	9. 442	9. 448	9. 455	9. 461	9. 468	9. 474	9. 480	9. 487	9. 493	1, 810
1, 820	9. 493	9. 500	9. 506	9. 512	9. 519	9. 525	9. 532	9. 538	9. 544	9. 551	9. 557	1, 820
1, 830	9. 557	9. 564	9. 570	9. 576	9. 583	9. 589	9. 596	9. 602	9. 609	9. 615	9. 621	1, 830
1, 840	9. 621	9. 628	9. 634	9. 641	9. 647	9. 654	9. 660	9. 666	9. 673	9. 679	9. 686	1, 840
1, 850	9. 686	9. 692	9. 699	9. 705	9. 711	9. 718	9. 724	9. 731	9. 737	9. 744	9. 750	1, 850
1, 860	9. 750	9. 757	9. 763	9. 769	9. 776	9. 782	9. 789	9. 795	9. 802	9. 808	9. 815	1, 860
1, 870	9. 815	9. 821	9. 828	9. 834	9. 840	9. 847	9. 853	9. 860	9. 866	9. 873	9. 879	1, 870
1, 880	9. 879	9. 886	9. 892	9. 899	9. 905	9. 912	9. 918	9. 925	9. 931	9. 937	9. 944	1, 880
1, 890	9. 944	9. 950	9. 957	9. 963	9. 970	9. 976	9. 983	9. 989	9. 996	10. 002	10. 009	1, 890
1, 900	10. 009	10. 015	10. 022	10. 028	10. 035	10. 041	10. 048	10. 054	10. 061	10. 067	10. 074	1, 900
1, 910	10. 074	10. 080	10. 087	10. 093	10. 100	10. 106	10. 113	10. 119	10. 126	10. 132	10. 139	1, 910
1, 920	10. 139	10. 145	10. 152	10. 158	10. 165	10. 171	10. 178	10. 184	10. 191	10. 197	10. 204	1, 920
1, 930	10. 204	10. 210	10. 217	10. 223	10. 230	10. 237	10. 243	10. 250	10. 256	10. 263	10. 269	1, 930
1, 940	10. 269	10. 276	10. 282	10. 289	10. 295	10. 302	10. 308	10. 315	10. 321	10. 328	10. 334	1, 940
1, 950	10. 334	10. 341	10. 348	10. 354	10. 361	10. 367	10. 374	10. 380	10. 387	10. 393	10. 400	1, 950
1, 960	10. 400	10. 406	10. 413	10. 420	10. 426	10. 433	10. 439	10. 446	10. 452	10. 459	10. 465	1, 960
1, 970	10. 465	10. 472	10. 478	10. 485	10. 492	10. 498	10. 505	10. 511	10. 518	10. 524	10. 531	1, 970
1, 980	10. 531	10. 538	10. 544	10. 551	10. 557	10. 564	10. 570	10. 577	10. 583	10. 590	10. 597	1, 980
1, 990	10. 597	10. 603	10. 610	10. 616	10. 623	10. 629	10. 636	10. 643	10. 649	10. 656	10. 662	1, 990
2, 000	10. 662	10. 669	10. 675	10. 682	10. 689	10. 695	10. 702	10. 708	10. 715	10. 722	10. 728	2, 000
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
	Millivolts											
<b>2,000</b>	10.662	10.669	10.675	10.682	10.689	10.695	10.702	10.708	10.715	10.722	10.728	<b>2,000</b>
<b>2,010</b>	10.728	10.735	10.741	10.748	10.754	10.761	10.768	10.774	10.781	10.787	10.794	<b>2,010</b>
<b>2,020</b>	10.794	10.801	10.807	10.814	10.820	10.827	10.834	10.840	10.847	10.853	10.860	<b>2,020</b>
<b>2,030</b>	10.860	10.866	10.873	10.880	10.886	10.893	10.899	10.906	10.913	10.919	10.926	<b>2,030</b>
<b>2,040</b>	10.926	10.932	10.939	10.946	10.952	10.959	10.966	10.972	10.979	10.985	10.992	<b>2,040</b>
<b>2,050</b>	10.992	10.999	11.005	11.012	11.018	11.025	11.032	11.038	11.045	11.051	11.058	<b>2,050</b>
<b>2,060</b>	11.058	11.065	11.071	11.078	11.085	11.091	11.098	11.104	11.111	11.118	11.124	<b>2,060</b>
<b>2,070</b>	11.124	11.131	11.137	11.144	11.151	11.157	11.164	11.171	11.177	11.184	11.190	<b>2,070</b>
<b>2,080</b>	11.190	11.197	11.204	11.210	11.217	11.224	11.230	11.237	11.243	11.250	11.257	<b>2,080</b>
<b>2,090</b>	11.257	11.263	11.270	11.277	11.283	11.290	11.296	11.303	11.310	11.316	11.323	<b>2,090</b>
<b>2,100</b>	11.323	11.330	11.336	11.343	11.350	11.356	11.363	11.369	11.376	11.383	11.389	<b>2,100</b>
<b>2,110</b>	11.389	11.396	11.403	11.409	11.416	11.423	11.429	11.436	11.442	11.449	11.456	<b>2,110</b>
<b>2,120</b>	11.456	11.462	11.469	11.476	11.482	11.489	11.496	11.502	11.509	11.516	11.522	<b>2,120</b>
<b>2,130</b>	11.522	11.529	11.536	11.542	11.549	11.556	11.562	11.569	11.575	11.582	11.589	<b>2,130</b>
<b>2,140</b>	11.589	11.595	11.602	11.609	11.615	11.622	11.629	11.635	11.642	11.649	11.655	<b>2,140</b>
<b>2,150</b>	11.655	11.662	11.669	11.675	11.682	11.689	11.695	11.702	11.709	11.715	11.722	<b>2,150</b>
<b>2,160</b>	11.722	11.729	11.735	11.742	11.749	11.755	11.762	11.769	11.775	11.782	11.789	<b>2,160</b>
<b>2,170</b>	11.789	11.795	11.802	11.809	11.815	11.822	11.829	11.835	11.842	11.848	11.855	<b>2,170</b>
<b>2,180</b>	11.855	11.862	11.868	11.875	11.882	11.888	11.895	11.902	11.908	11.915	11.922	<b>2,180</b>
<b>2,190</b>	11.922	11.928	11.935	11.942	11.949	11.955	11.962	11.969	11.975	11.982	11.989	<b>2,190</b>
<b>2,200</b>	11.989	11.995	12.002	12.009	12.015	12.022	12.029	12.035	12.042	12.049	12.055	<b>2,200</b>
<b>2,210</b>	12.055	12.062	12.069	12.075	12.082	12.089	12.095	12.102	12.109	12.115	12.122	<b>2,210</b>
<b>2,220</b>	12.122	12.129	12.135	12.142	12.149	12.155	12.162	12.169	12.175	12.182	12.189	<b>2,220</b>
<b>2,230</b>	12.189	12.196	12.202	12.209	12.216	12.222	12.229	12.236	12.242	12.249	12.256	<b>2,230</b>
<b>2,240</b>	12.256	12.262	12.269	12.276	12.282	12.289	12.296	12.302	12.309	12.316	12.322	<b>2,240</b>
<b>2,250</b>	12.322	12.329	12.336	12.342	12.349	12.356	12.363	12.369	12.376	12.383	12.389	<b>2,250</b>
<b>2,260</b>	12.389	12.396	12.403	12.409	12.416	12.423	12.429	12.436	12.443	12.449	12.456	<b>2,260</b>
<b>2,270</b>	12.456	12.463	12.470	12.476	12.483	12.490	12.496	12.503	12.510	12.516	12.523	<b>2,270</b>
<b>2,280</b>	12.523	12.530	12.536	12.543	12.550	12.556	12.563	12.570	12.577	12.583	12.590	<b>2,280</b>
<b>2,290</b>	12.590	12.597	12.603	12.610	12.617	12.623	12.630	12.637	12.643	12.650	12.657	<b>2,290</b>
<b>2,300</b>	12.657	12.663	12.670	12.677	12.684	12.690	12.697	12.704	12.710	12.717	12.724	<b>2,300</b>
<b>2,310</b>	12.724	12.730	12.737	12.744	12.750	12.757	12.764	12.770	12.777	12.784	12.790	<b>2,310</b>
<b>2,320</b>	12.790	12.797	12.804	12.810	12.817	12.824	12.830	12.837	12.844	12.851	12.857	<b>2,320</b>
<b>2,330</b>	12.857	12.864	12.871	12.877	12.884	12.891	12.897	12.904	12.911	12.917	12.924	<b>2,330</b>
<b>2,340</b>	12.924	12.931	12.937	12.944	12.951	12.957	12.964	12.971	12.977	12.984	12.991	<b>2,340</b>
<b>2,350</b>	12.991	12.997	13.004	13.011	13.018	13.024	13.031	13.038	13.044	13.051	13.058	<b>2,350</b>
<b>2,360</b>	13.058	13.064	13.071	13.078	13.084	13.091	13.098	13.104	13.111	13.118	13.124	<b>2,360</b>
<b>2,370</b>	13.124	13.131	13.138	13.144	13.151	13.158	13.164	13.171	13.178	13.184	13.191	<b>2,370</b>
<b>2,380</b>	13.191	13.198	13.204	13.211	13.218	13.224	13.231	13.238	13.244	13.251	13.258	<b>2,380</b>
<b>2,390</b>	13.258	13.265	13.271	13.278	13.285	13.291	13.298	13.305	13.311	13.318	13.325	<b>2,390</b>
<b>2,400</b>	13.325	13.331	13.338	13.345	13.351	13.358	13.365	13.371	13.378	13.385	13.391	<b>2,400</b>
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
2,400	13.325	13.331	13.338	13.345	13.351	13.358	13.365	13.371	13.378	13.385	13.391	2,400
2,410	13.391	13.398	13.405	13.411	13.418	13.425	13.431	13.438	13.445	13.451	13.458	2,410
2,420	13.458	13.465	13.471	13.478	13.485	13.491	13.498	13.505	13.511	13.518	13.525	2,420
2,430	13.525	13.531	13.538	13.545	13.551	13.558	13.565	13.571	13.578	13.585	13.591	2,430
2,440	13.591	13.598	13.605	13.611	13.618	13.625	13.631	13.638	13.645	13.651	13.658	2,440
2,450	13.658	13.665	13.671	13.678	13.685	13.691	13.698	13.705	13.711	13.718	13.725	2,450
2,460	13.725	13.731	13.738	13.745	13.751	13.758	13.765	13.771	13.778	13.785	13.791	2,460
2,470	13.791	13.798	13.805	13.811	13.818	13.825	13.831	13.838	13.845	13.851	13.858	2,470
2,480	13.858	13.865	13.871	13.878	13.885	13.891	13.898	13.905	13.911	13.918	13.924	2,480
2,490	13.924	13.931	13.938	13.944	13.951	13.958	13.964	13.971	13.978	13.984	13.991	2,490
2,500	13.991	13.998	14.004	14.011	14.018	14.024	14.031	14.038	14.044	14.051	14.058	2,500
2,510	14.058	14.064	14.071	14.078	14.084	14.091	14.098	14.104	14.111	14.118	14.124	2,510
2,520	14.124	14.131	14.137	14.144	14.151	14.157	14.164	14.171	14.177	14.184	14.191	2,520
2,530	14.191	14.197	14.204	14.211	14.217	14.224	14.231	14.237	14.244	14.251	14.257	2,530
2,540	14.257	14.264	14.271	14.277	14.284	14.290	14.297	14.304	14.310	14.317	14.324	2,540
2,550	14.324	14.330	14.337	14.344	14.350	14.357	14.364	14.370	14.377	14.384	14.390	2,550
2,560	14.390	14.397	14.403	14.410	14.417	14.423	14.430	14.437	14.443	14.450	14.457	2,560
2,570	14.457	14.463	14.470	14.477	14.483	14.490	14.497	14.503	14.510	14.516	14.523	2,570
2,580	14.523	14.530	14.536	14.543	14.550	14.556	14.563	14.570	14.576	14.583	14.589	2,580
2,590	14.589	14.596	14.603	14.609	14.616	14.623	14.629	14.636	14.643	14.649	14.656	2,590
2,600	14.656	14.663	14.669	14.676	14.682	14.689	14.696	14.702	14.709	14.716	14.722	2,600
2,610	14.722	14.729	14.736	14.742	14.749	14.755	14.762	14.769	14.775	14.782	14.789	2,610
2,620	14.789	14.795	14.802	14.809	14.815	14.822	14.828	14.835	14.842	14.848	14.855	2,620
2,630	14.855	14.862	14.868	14.875	14.881	14.888	14.895	14.901	14.908	14.915	14.921	2,630
2,640	14.921	14.928	14.935	14.941	14.948	14.954	14.961	14.968	14.974	14.981	14.988	2,640
2,650	14.988	14.994	15.001	15.007	15.014	15.021	15.027	15.034	15.041	15.047	15.054	2,650
2,660	15.054	15.060	15.067	15.074	15.080	15.087	15.094	15.100	15.107	15.113	15.120	2,660
2,670	15.120	15.127	15.133	15.140	15.147	15.153	15.160	15.166	15.173	15.180	15.186	2,670
2,680	15.186	15.193	15.200	15.206	15.213	15.219	15.226	15.233	15.239	15.246	15.253	2,680
2,690	15.253	15.259	15.266	15.272	15.279	15.286	15.292	15.299	15.305	15.312	15.319	2,690
2,700	15.319	15.325	15.332	15.339	15.345	15.352	15.358	15.365	15.372	15.378	15.385	2,700
2,710	15.385	15.391	15.398	15.405	15.411	15.418	15.425	15.431	15.438	15.444	15.451	2,710
2,720	15.451	15.458	15.464	15.471	15.477	15.484	15.491	15.497	15.504	15.510	15.517	2,720
2,730	15.517	15.524	15.530	15.537	15.544	15.550	15.557	15.563	15.570	15.577	15.583	2,730
2,740	15.583	15.590	15.596	15.603	15.610	15.616	15.623	15.629	15.636	15.643	15.649	2,740
2,750	15.649	15.656	15.662	15.669	15.676	15.682	15.689	15.695	15.702	15.709	15.715	2,750
2,760	15.715	15.722	15.728	15.735	15.742	15.748	15.755	15.761	15.768	15.775	15.781	2,760
2,770	15.781	15.788	15.794	15.801	15.808	15.814	15.821	15.827	15.834	15.841	15.847	2,770
2,780	15.847	15.854	15.860	15.867	15.874	15.880	15.887	15.893	15.900	15.907	15.913	2,780
2,790	15.913	15.920	15.926	15.933	15.940	15.946	15.953	15.959	15.966	15.973	15.979	2,790
2,800	15.979	15.986	15.992	15.999	16.006	16.012	16.019	16.025	16.032	16.038	16.045	2,800
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 13. Platinum Versus Platinum-10-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
Millivolts												
2,800	15.979	15.986	15.992	15.999	16.006	16.012	16.019	16.025	16.032	16.038	16.045	2,800
2,810	16.045	16.052	16.058	16.065	16.071	16.078	16.085	16.091	16.098	16.104	16.111	2,810
2,820	16.111	16.117	16.124	16.131	16.137	16.144	16.150	16.157	16.164	16.170	16.177	2,820
2,830	16.177	16.183	16.190	16.196	16.203	16.210	16.216	16.223	16.229	16.236	16.243	2,830
2,840	16.243	16.249	16.256	16.262	16.269	16.275	16.282	16.289	16.295	16.302	16.308	2,840
2,850	16.308	16.315	16.322	16.328	16.335	16.341	16.348	16.354	16.361	16.368	16.374	2,850
2,860	16.374	16.381	16.387	16.394	16.400	16.407	16.414	16.420	16.427	16.433	16.440	2,860
2,870	16.440	16.446	16.453	16.460	16.466	16.473	16.479	16.486	16.492	16.499	16.506	2,870
2,880	16.506	16.512	16.519	16.525	16.532	16.538	16.545	16.552	16.558	16.565	16.571	2,880
2,890	16.571	16.578	16.584	16.591	16.597	16.604	16.611	16.617	16.624	16.630	16.637	2,890
2,900	16.637	16.643	16.650	16.657	16.663	16.670	16.676	16.683	16.689	16.696	16.702	2,900
2,910	16.702	16.709	16.716	16.722	16.729	16.735	16.742	16.748	16.755	16.761	16.768	2,910
2,920	16.768	16.775	16.781	16.788	16.794	16.801	16.807	16.814	16.820	16.827	16.834	2,920
2,930	16.834	16.840	16.847	16.853	16.860	16.866	16.873	16.879	16.886	16.893	16.899	2,930
2,940	16.899	16.906	16.912	16.919	16.925	16.932	16.938	16.945	16.952	16.958	16.965	2,940
2,950	16.965	16.971	16.978	16.984	16.991	16.997	17.004	17.010	17.017	17.023	17.030	2,950
2,960	17.030	17.037	17.043	17.050	17.056	17.063	17.069	17.076	17.082	17.089	17.095	2,960
2,970	17.095	17.102	17.109	17.115	17.122	17.128	17.135	17.141	17.148	17.154	17.161	2,970
2,980	17.161	17.167	17.174	17.180	17.187	17.194	17.200	17.207	17.213	17.220	17.226	2,980
2,990	17.226	17.233	17.239	17.246	17.252	17.259	17.265	17.272	17.278	17.285	17.292	2,990
3,000	17.292	17.298	17.305	17.311	17.318	17.324	17.331	17.337	17.344	17.350	17.357	3,000
3,010	17.357	17.363	17.370	17.376	17.383	17.389	17.396	17.402	17.409	17.416	17.422	3,010
3,020	17.422	17.429	17.435	17.442	17.448	17.455	17.461	17.468	17.474	17.481	17.487	3,020
3,030	17.487	17.494	17.500	17.507	17.513	17.520	17.526	17.533	17.539	17.546	17.552	3,030
3,040	17.552	17.559	17.565	17.572	17.578	17.585	17.592	17.598	17.605	17.611	17.618	3,040
3,050	17.618	17.624	17.631	17.637	17.644	17.650	17.657	17.663	17.670	17.676	17.683	3,050
3,060	17.683	17.689	17.696	17.702	17.709	17.715	17.722	17.728	17.735	17.741	17.748	3,060
3,070	17.748	17.754	17.761	17.767	17.774	17.780	17.787	17.793	17.800	17.806	17.813	3,070
3,080	17.813	17.819	17.826	17.832	17.839	17.845	17.852	17.858	17.865	17.871	17.878	3,080
3,090	17.878	17.884	17.891	17.897	17.904	17.910	17.917	17.923	17.930	17.936	17.943	3,090
3,100	17.943	17.949	17.956	17.962	17.969	17.975	17.982	17.988	17.995	18.001	18.008	3,100
3,110	18.008	18.014	18.021	18.027	18.034	18.040	18.047	18.053	18.060	18.066	18.073	3,110
3,120	18.073	18.079	18.086	18.092	18.098	18.105	18.111	18.118	18.124	18.131	18.137	3,120
3,130	18.137	18.144	18.150	18.157	18.163	18.170	18.176	18.183	18.189	18.196	18.202	3,130
3,140	18.202	18.209	18.215	18.222	18.228	18.235	18.241	18.248	18.254	18.260	18.267	3,140
3,150	18.267	18.273	18.280	18.286	18.293	18.299	18.306	18.312	18.319	18.325	18.332	3,150
3,160	18.332	18.338	18.345	18.351	18.358	18.364	18.371	18.377	18.383	18.390	18.396	3,160
3,170	18.396	18.403	18.409	18.416	18.422	18.429	18.435	18.442	18.448	18.455	18.461	3,170
3,180	18.461	18.468	18.474	18.480	18.487	18.493	18.500	18.506	18.513	18.519	18.526	3,180
3,190	18.526	18.532	18.539	18.545	18.551	18.558	18.564	18.571	18.577	18.584	18.590	3,190
3,200	18.590	18.597	18.603	18.610	18.616	18.622	18.629	18.635	18.642	18.648	18.655	3,200
3,210	18.655	18.661	18.668	18.674	18.681	18.687	-----	-----	-----	-----	-----	3,210
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.

# Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
0.000	32.0	35.3	38.7	42.0	45.2	48.5	51.7	54.8	58.0	61.1	64.2	0.000
.100	64.2	67.3	70.3	73.4	76.4	79.4	82.4	85.4	88.4	91.3	94.2	.100
.200	94.2	97.1	100.1	102.9	105.8	108.7	111.5	114.3	117.1	119.9	122.7	.200
.300	122.7	125.5	128.2	131.0	133.7	136.4	139.2	141.9	144.6	147.2	149.9	.300
.400	149.9	152.6	155.2	157.8	160.5	163.1	165.7	168.3	170.9	173.4	175.9	.400
.500	175.9	178.5	181.1	183.6	186.1	188.6	191.1	193.6	196.1	198.6	201.0	.500
.600	201.0	203.5	205.9	208.3	210.8	213.2	215.6	218.0	220.4	222.7	225.1	.600
.700	225.1	227.5	229.8	232.2	234.5	236.9	239.2	241.6	243.9	246.2	248.5	.700
.800	248.5	250.8	253.1	255.4	257.7	259.9	262.2	264.5	266.7	269.0	271.2	.800
.900	271.2	273.5	275.7	277.9	280.2	282.4	284.6	286.9	289.1	291.3	293.5	.900
1.000	293.5	295.7	297.9	300.1	302.3	304.5	306.7	308.9	311.1	313.2	315.4	1.000
1.100	315.4	317.6	319.7	321.9	324.1	326.3	328.4	330.6	332.7	334.9	337.0	1.100
1.200	337.0	339.1	341.3	343.4	345.5	347.6	349.7	351.8	353.9	356.0	358.1	1.200
1.300	358.1	360.2	362.3	364.4	366.4	368.5	370.6	372.6	374.7	376.7	378.8	1.300
1.400	378.8	380.9	382.9	385.0	387.0	389.0	391.1	393.1	395.1	397.2	399.2	1.400
1.500	399.2	401.2	403.2	405.3	407.3	409.3	411.3	413.4	415.4	417.4	419.4	1.500
1.600	419.4	421.4	423.4	425.4	427.4	429.4	431.3	433.3	435.3	437.3	439.3	1.600
1.700	439.3	441.3	443.3	445.2	447.2	449.2	451.1	453.1	455.1	457.0	459.0	1.700
1.800	459.0	460.9	462.9	464.8	466.8	468.7	470.7	472.6	474.6	476.5	478.4	1.800
1.900	478.4	480.4	482.3	484.2	486.1	488.1	490.0	491.9	493.9	495.8	497.7	1.900
2.000	497.7	499.6	501.5	503.4	505.3	507.2	509.1	511.0	512.9	514.9	516.8	2.000
2.100	516.8	518.6	520.5	522.4	524.3	526.2	528.1	529.9	531.8	533.7	535.6	2.100
2.200	535.6	537.5	539.4	541.3	543.1	545.0	546.9	548.8	550.6	552.5	554.4	2.200
2.300	554.4	556.3	558.1	560.0	561.8	563.7	565.5	567.4	569.2	571.1	572.9	2.300
2.400	572.9	574.7	576.6	578.4	580.3	582.1	584.0	585.8	587.6	589.5	591.3	2.400
2.500	591.3	593.1	595.0	596.8	598.6	600.5	602.3	604.1	605.9	607.8	609.6	2.500
2.600	609.6	611.4	613.2	615.1	616.9	618.7	620.5	622.4	624.2	626.0	627.8	2.600
2.700	627.8	629.6	631.4	633.2	635.0	636.8	638.6	640.4	642.2	644.0	645.8	2.700
2.800	645.8	647.6	649.4	651.2	653.0	654.8	656.6	658.4	660.2	662.0	663.8	2.800
2.900	663.8	665.6	667.4	669.2	670.9	672.7	674.5	676.3	678.1	679.8	681.6	2.900
3.000	681.6	683.4	685.2	686.9	688.7	690.5	692.3	694.1	695.8	697.6	699.4	3.000
3.100	699.4	701.2	702.9	704.7	706.5	708.3	710.0	711.8	713.6	715.3	717.1	3.100
3.200	717.1	718.9	720.6	722.4	724.2	725.9	727.7	729.4	731.2	732.9	734.7	3.200
3.300	734.7	736.4	738.2	740.0	741.7	743.4	745.2	747.0	748.7	750.5	752.2	3.300
3.400	752.2	753.9	755.7	757.4	759.2	760.9	762.7	764.4	766.1	767.9	769.6	3.400
3.500	769.6	771.3	773.1	774.8	776.5	778.3	780.0	781.7	783.4	785.2	786.9	3.500
3.600	786.9	788.6	790.3	792.1	793.8	795.5	797.2	798.9	800.6	802.3	804.0	3.600
3.700	804.0	805.7	807.4	809.1	810.8	812.6	814.3	816.0	817.7	819.4	821.1	3.700
3.800	821.1	822.8	824.5	826.2	827.9	829.6	831.3	833.0	834.7	836.4	838.2	3.800
3.900	838.2	839.8	841.5	843.2	844.9	846.6	848.3	850.0	851.7	853.4	855.2	3.900
4.000	855.2	856.8	858.5	860.2	861.9	863.6	865.4	867.1	868.8	870.5	872.2	4.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.



**Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
4.000	855.2	856.8	858.5	860.2	861.9	863.6	865.4	867.1	868.8	870.5	872.2	4.000
4.100	872.2	873.9	875.6	877.3	879.0	880.7	882.4	884.1	885.8	887.5	889.1	4.100
4.200	889.1	890.9	892.6	894.3	895.9	897.6	899.3	901.0	902.7	904.3	906.0	4.200
4.300	906.0	907.7	909.4	911.0	912.7	914.4	916.1	917.8	919.4	921.1	922.8	4.300
4.400	922.8	924.5	926.2	927.8	929.5	931.2	932.9	934.6	936.2	937.9	939.5	4.400
4.500	939.5	941.3	942.9	944.6	946.2	947.9	949.5	951.2	952.8	954.5	956.1	4.500
4.600	956.1	957.7	959.4	961.0	962.7	964.3	965.9	967.6	969.2	970.9	972.5	4.600
4.700	972.5	974.1	975.8	977.4	979.1	980.7	982.3	984.0	985.6	987.3	988.9	4.700
4.800	988.9	990.5	992.2	993.8	995.4	997.1	998.7	1000.3	1001.9	1003.6	1005.2	4.800
4.900	1005.2	1006.8	1008.4	1010.0	1011.7	1013.3	1014.9	1016.6	1018.2	1019.8	1021.4	4.900
5.000	1021.4	1023.0	1024.6	1026.3	1027.9	1029.5	1031.1	1032.7	1034.4	1036.0	1037.6	5.000
5.100	1037.6	1039.2	1040.8	1042.5	1044.1	1045.7	1047.3	1048.9	1050.6	1052.2	1053.8	5.100
5.200	1053.8	1055.4	1057.0	1058.6	1060.3	1061.9	1063.5	1065.1	1066.7	1068.3	1069.9	5.200
5.300	1069.9	1071.5	1073.1	1074.7	1076.3	1077.9	1079.5	1081.1	1082.7	1084.3	1085.9	5.300
5.400	1085.9	1087.5	1089.1	1090.7	1092.3	1093.9	1095.5	1097.1	1098.7	1100.3	1101.9	5.400
5.500	1101.9	1103.5	1105.1	1106.7	1108.3	1109.9	1111.5	1113.0	1114.6	1116.2	1117.8	5.500
5.600	1117.8	1119.4	1121.0	1122.6	1124.1	1125.7	1127.3	1128.9	1130.4	1132.0	1133.6	5.600
5.700	1133.6	1135.2	1136.7	1138.3	1139.9	1141.5	1143.0	1144.6	1146.2	1147.7	1149.3	5.700
5.800	1149.3	1150.8	1152.4	1154.0	1155.6	1157.1	1158.7	1160.2	1161.8	1163.3	1164.9	5.800
5.900	1164.9	1166.5	1168.0	1169.6	1171.2	1172.7	1174.3	1175.9	1177.5	1179.0	1180.6	5.900
6.000	1180.6	1182.2	1183.7	1185.3	1186.9	1188.4	1190.0	1191.5	1193.1	1194.7	1196.2	6.000
6.100	1196.2	1197.8	1199.3	1200.9	1202.5	1204.0	1205.6	1207.2	1208.7	1210.3	1211.8	6.100
6.200	1211.8	1213.4	1215.0	1216.5	1218.1	1219.7	1221.2	1222.8	1224.3	1225.9	1227.4	6.200
6.300	1227.4	1229.0	1230.5	1232.1	1233.6	1235.2	1236.7	1238.3	1239.8	1241.4	1242.9	6.300
6.400	1242.9	1244.4	1246.0	1247.5	1249.1	1250.6	1252.2	1253.7	1255.2	1256.8	1258.3	6.400
6.500	1258.3	1259.8	1261.4	1262.9	1264.4	1266.0	1267.5	1269.0	1270.5	1272.1	1273.6	6.500
6.600	1273.6	1275.1	1276.7	1278.2	1279.7	1281.3	1282.8	1284.3	1285.8	1287.4	1288.9	6.600
6.700	1288.9	1290.4	1292.0	1293.5	1295.0	1296.6	1298.1	1299.6	1301.1	1302.7	1304.2	6.700
6.800	1304.2	1305.7	1307.2	1308.8	1310.3	1311.8	1313.3	1314.9	1316.4	1317.9	1319.4	6.800
6.900	1319.4	1320.9	1322.4	1323.9	1325.5	1327.0	1328.5	1330.0	1331.5	1333.0	1334.5	6.900
7.000	1334.5	1336.0	1337.5	1339.0	1340.5	1342.1	1343.6	1345.1	1346.6	1348.1	1349.6	7.000
7.100	1349.6	1351.1	1352.6	1354.1	1355.6	1357.2	1358.7	1360.2	1361.7	1363.2	1364.7	7.100
7.200	1364.7	1366.2	1367.7	1369.2	1370.7	1372.2	1373.7	1375.2	1376.7	1378.2	1379.7	7.200
7.300	1379.7	1381.2	1382.7	1384.2	1385.7	1387.2	1388.6	1390.1	1391.6	1393.1	1394.6	7.300
7.400	1394.6	1396.1	1397.6	1399.1	1400.6	1402.1	1403.5	1405.0	1406.5	1408.0	1409.5	7.400
7.500	1409.5	1411.0	1412.5	1414.0	1415.4	1416.9	1418.4	1419.9	1421.3	1422.8	1424.3	7.500
7.600	1424.3	1425.8	1427.3	1428.7	1430.2	1431.7	1433.2	1434.7	1436.1	1437.6	1439.1	7.600
7.700	1439.1	1440.6	1442.0	1443.5	1445.0	1446.5	1447.9	1449.4	1450.9	1452.3	1453.8	7.700
7.800	1453.8	1455.3	1456.7	1458.2	1459.7	1461.1	1462.6	1464.0	1465.5	1466.9	1468.4	7.800
7.900	1468.4	1469.9	1471.3	1472.8	1474.3	1475.7	1477.2	1478.7	1480.2	1481.6	1483.1	7.900
8.000	1483.1	1484.6	1486.0	1487.5	1489.0	1490.4	1491.9	1493.3	1494.8	1496.2	1497.7	8.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
8.000	1483.1	1484.6	1486.0	1487.5	1489.0	1490.4	1491.9	1493.3	1494.8	1496.2	1497.7	8.000
8.100	1497.7	1499.2	1500.6	1502.1	1503.5	1505.0	1506.5	1508.0	1509.4	1510.9	1512.3	8.100
8.200	1512.3	1513.8	1515.2	1516.7	1518.1	1519.6	1521.0	1522.5	1523.9	1525.4	1526.8	8.200
8.300	1526.8	1528.3	1529.7	1531.2	1532.6	1534.1	1535.5	1537.0	1538.4	1539.9	1541.3	8.300
8.400	1541.3	1542.7	1544.2	1545.6	1547.1	1548.5	1550.0	1551.4	1552.8	1554.3	1555.7	8.400
8.500	1555.7	1557.1	1558.6	1560.0	1561.5	1562.9	1564.3	1565.8	1567.2	1568.7	1570.1	8.500
8.600	1570.1	1571.5	1573.0	1574.4	1575.9	1577.3	1578.7	1580.2	1581.6	1583.1	1584.5	8.600
8.700	1584.5	1585.9	1587.4	1588.8	1590.2	1591.7	1593.1	1594.5	1596.0	1597.4	1598.8	8.700
8.800	1598.8	1600.2	1601.7	1603.1	1604.5	1606.0	1607.4	1608.8	1610.2	1611.7	1613.1	8.800
8.900	1613.1	1614.5	1615.9	1617.4	1618.8	1620.2	1621.6	1623.1	1624.5	1625.9	1627.3	8.900
9.000	1627.3	1628.7	1630.1	1631.6	1633.0	1634.4	1635.8	1637.2	1638.6	1640.0	1641.4	9.000
9.100	1641.4	1642.9	1644.3	1645.7	1647.1	1648.5	1649.9	1651.3	1652.7	1654.1	1655.5	9.100
9.200	1655.5	1656.9	1658.3	1659.7	1661.1	1662.6	1664.0	1665.4	1666.8	1668.2	1669.6	9.200
9.300	1669.6	1671.0	1672.4	1673.8	1675.2	1676.7	1678.1	1679.5	1680.9	1682.3	1683.7	9.300
9.400	1683.7	1685.1	1686.5	1687.9	1689.3	1690.7	1692.1	1693.5	1694.9	1696.3	1697.7	9.400
9.500	1697.7	1699.1	1700.5	1701.9	1703.3	1704.7	1706.1	1707.6	1709.0	1710.4	1711.8	9.500
9.600	1711.8	1713.2	1714.6	1716.0	1717.4	1718.8	1720.2	1721.6	1723.0	1724.4	1725.8	9.600
9.700	1725.8	1727.2	1728.6	1730.0	1731.4	1732.8	1734.2	1735.6	1737.0	1738.4	1739.8	9.700
9.800	1739.8	1741.2	1742.6	1744.0	1745.4	1746.8	1748.2	1749.5	1750.9	1752.3	1753.7	9.800
9.900	1753.7	1755.1	1756.5	1757.8	1759.2	1760.6	1761.9	1763.3	1764.7	1766.0	1767.4	9.900
10.000	1767.4	1768.8	1770.1	1771.5	1772.9	1774.3	1775.6	1777.0	1778.4	1779.7	1781.2	10.000
10.100	1781.2	1782.5	1783.9	1785.2	1786.6	1788.0	1789.4	1790.7	1792.1	1793.5	1794.9	10.100
10.200	1794.9	1796.3	1797.6	1799.0	1800.4	1801.8	1803.1	1804.5	1805.9	1807.2	1808.6	10.200
10.300	1808.6	1810.0	1811.3	1812.7	1814.1	1815.5	1816.8	1818.2	1819.6	1820.9	1822.3	10.300
10.400	1822.3	1823.7	1825.0	1826.4	1827.8	1829.2	1830.5	1831.9	1833.3	1834.6	1836.0	10.400
10.500	1836.0	1837.4	1838.7	1840.1	1841.5	1842.8	1844.2	1845.5	1846.9	1848.3	1849.6	10.500
10.600	1849.6	1851.0	1852.3	1853.7	1855.1	1856.4	1857.8	1859.2	1860.6	1861.9	1863.3	10.600
10.700	1863.3	1864.7	1866.0	1867.4	1868.7	1870.1	1871.4	1872.8	1874.1	1875.5	1876.8	10.700
10.800	1876.8	1878.1	1879.5	1880.8	1882.2	1883.5	1884.9	1886.2	1887.5	1888.9	1890.2	10.800
10.900	1890.2	1891.5	1892.9	1894.2	1895.6	1896.9	1898.2	1899.6	1900.9	1902.3	1903.6	10.900
11.000	1903.6	1904.9	1906.3	1907.6	1909.0	1910.3	1911.6	1913.0	1914.3	1915.6	1917.0	11.000
11.100	1917.0	1918.3	1919.7	1921.0	1922.3	1923.6	1925.0	1926.3	1927.6	1929.0	1930.3	11.100
11.200	1930.3	1931.6	1933.0	1934.3	1935.6	1937.0	1938.3	1939.6	1940.9	1942.3	1943.6	11.200
11.300	1943.6	1944.9	1946.3	1947.6	1949.0	1950.3	1951.6	1952.9	1954.2	1955.6	1956.9	11.300
11.400	1956.9	1958.2	1959.5	1960.9	1962.2	1963.5	1964.8	1966.2	1967.5	1968.8	1970.1	11.400
11.500	1970.1	1971.4	1972.7	1974.1	1975.4	1976.7	1978.0	1979.3	1980.7	1982.0	1983.3	11.500
11.600	1983.3	1984.6	1986.8	1987.3	1988.6	1989.9	1991.2	1992.5	1993.9	1995.2	1996.5	11.600
11.700	1996.5	1997.8	1999.1	2000.5	2001.8	2003.1	2004.4	2005.7	2007.1	2008.4	2009.7	11.700
11.800	2009.7	2011.0	2012.3	2013.7	2015.0	2016.3	2017.6	2018.9	2020.3	2021.6	2022.9	11.800
11.900	2022.9	2024.2	2025.5	2026.9	2028.2	2029.5	2030.8	2032.1	2033.5	2034.8	2036.1	11.900
12.000	2036.1	2037.4	2038.7	2040.1	2041.4	2042.7	2044.0	2045.3	2046.7	2048.0	2049.3	12.000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
12. 000	2036. 1	2037. 4	2038. 7	2040. 1	2041. 4	2042. 7	2044. 0	2045. 3	2046. 7	2048. 0	2049. 3	12. 000
12. 100	2049. 3	2050. 6	2051. 9	2053. 2	2054. 5	2055. 8	2057. 2	2058. 5	2059. 8	2061. 1	2062. 4	12. 100
12. 200	2062. 4	2063. 7	2065. 0	2066. 3	2067. 6	2069. 0	2070. 3	2071. 6	2072. 9	2074. 2	2075. 5	12. 200
12. 300	2075. 5	2076. 8	2078. 1	2079. 4	2080. 7	2082. 0	2083. 3	2084. 6	2085. 9	2087. 2	2088. 6	12. 300
12. 400	2088. 6	2089. 8	2091. 1	2092. 4	2093. 7	2095. 0	2096. 3	2097. 7	2099. 0	2100. 3	2101. 6	12. 400
12. 500	2101. 6	2102. 9	2104. 2	2105. 5	2106. 8	2108. 2	2109. 5	2110. 8	2112. 1	2113. 4	2114. 7	12. 500
12. 600	2114. 7	2116. 0	2117. 3	2118. 6	2119. 9	2121. 2	2122. 5	2123. 8	2125. 1	2126. 4	2127. 7	12. 600
12. 700	2127. 7	2129. 0	2130. 3	2131. 6	2132. 9	2134. 2	2135. 5	2136. 8	2138. 1	2139. 4	2140. 7	12. 700
12. 800	2140. 7	2142. 0	2143. 3	2144. 6	2145. 9	2147. 2	2148. 5	2149. 9	2151. 2	2152. 5	2153. 8	12. 800
12. 900	2153. 8	2155. 1	2156. 4	2157. 7	2159. 0	2160. 3	2161. 6	2162. 9	2164. 2	2165. 5	2166. 8	12. 900
13. 000	2166. 8	2168. 1	2169. 4	2170. 7	2172. 0	2173. 3	2174. 6	2175. 9	2177. 2	2178. 5	2179. 8	13. 000
13. 100	2179. 8	2181. 1	2182. 4	2183. 7	2185. 0	2186. 3	2187. 7	2189. 0	2190. 3	2191. 6	2192. 9	13. 100
13. 200	2192. 9	2194. 2	2195. 5	2196. 8	2198. 1	2199. 4	2200. 7	2202. 0	2203. 3	2204. 6	2205. 9	13. 200
13. 300	2205. 9	2207. 2	2208. 5	2209. 8	2211. 1	2212. 4	2213. 6	2214. 9	2216. 2	2217. 5	2218. 8	13. 300
13. 400	2218. 8	2220. 1	2221. 4	2222. 7	2224. 0	2225. 3	2226. 6	2227. 9	2229. 2	2230. 5	2231. 8	13. 400
13. 500	2231. 8	2233. 1	2234. 4	2235. 7	2237. 0	2238. 3	2239. 5	2240. 8	2242. 1	2243. 4	2244. 7	13. 500
13. 600	2244. 7	2246. 0	2247. 3	2248. 6	2249. 9	2251. 2	2252. 5	2253. 8	2255. 1	2256. 4	2257. 7	13. 600
13. 700	2257. 7	2259. 0	2260. 3	2261. 6	2262. 9	2264. 2	2265. 5	2266. 8	2268. 1	2269. 4	2270. 7	13. 700
13. 800	2270. 7	2272. 0	2273. 3	2274. 6	2275. 9	2277. 2	2278. 4	2279. 7	2281. 0	2282. 3	2283. 6	13. 800
13. 900	2283. 6	2284. 9	2286. 2	2287. 5	2288. 8	2290. 1	2291. 4	2292. 7	2294. 0	2295. 3	2296. 6	13. 900
14. 000	2296. 6	2297. 9	2299. 2	2300. 5	2301. 8	2303. 0	2304. 3	2305. 6	2306. 9	2308. 2	2309. 5	14. 000
14. 100	2309. 5	2310. 8	2312. 1	2313. 4	2314. 7	2316. 0	2317. 3	2318. 6	2319. 9	2321. 2	2322. 5	14. 100
14. 200	2322. 5	2323. 8	2325. 1	2326. 4	2327. 7	2329. 0	2330. 3	2331. 6	2332. 9	2334. 2	2335. 5	14. 200
14. 300	2335. 5	2336. 8	2338. 1	2339. 4	2340. 7	2342. 0	2343. 2	2344. 5	2345. 8	2347. 1	2348. 4	14. 300
14. 400	2348. 4	2349. 7	2351. 0	2352. 3	2353. 6	2354. 9	2356. 1	2357. 4	2358. 7	2360. 0	2361. 3	14. 400
14. 500	2361. 3	2362. 6	2363. 9	2365. 2	2365. 5	2367. 8	2369. 0	2370. 3	2371. 6	2372. 9	2374. 2	14. 500
14. 600	2374. 2	2375. 5	2376. 8	2378. 1	2379. 4	2380. 7	2382. 0	2383. 3	2384. 6	2385. 9	2387. 2	14. 600
14. 700	2387. 2	2388. 5	2389. 8	2391. 1	2392. 4	2393. 7	2395. 0	2396. 3	2397. 6	2398. 9	2400. 2	14. 700
14. 800	2400. 2	2401. 5	2402. 8	2404. 1	2405. 3	2406. 7	2408. 0	2409. 3	2410. 6	2411. 9	2413. 2	14. 800
14. 900	2413. 2	2414. 5	2415. 8	2417. 1	2418. 4	2419. 7	2421. 0	2422. 3	2423. 6	2424. 9	2426. 2	14. 900
15. 000	2426. 2	2427. 5	2428. 8	2430. 1	2431. 4	2432. 7	2433. 9	2435. 2	2436. 5	2437. 8	2439. 1	15. 000
15. 100	2439. 1	2440. 4	2441. 7	2443. 0	2444. 3	2445. 6	2446. 9	2448. 2	2449. 5	2450. 8	2452. 1	15. 100
15. 200	2452. 1	2453. 4	2454. 7	2456. 0	2457. 3	2458. 6	2459. 9	2461. 2	2462. 5	2463. 8	2465. 1	15. 200
15. 300	2465. 1	2466. 4	2467. 7	2469. 0	2470. 3	2471. 6	2472. 8	2474. 1	2475. 4	2476. 7	2478. 0	15. 300
15. 400	2478. 0	2479. 3	2480. 6	2481. 9	2483. 2	2484. 5	2485. 8	2487. 1	2488. 4	2489. 7	2491. 0	15. 400
15. 500	2491. 0	2492. 3	2493. 6	2494. 9	2496. 2	2497. 6	2498. 9	2500. 2	2501. 5	2502. 8	2504. 1	15. 500
15. 600	2504. 1	2505. 4	2506. 7	2508. 0	2509. 3	2510. 6	2511. 9	2513. 2	2514. 5	2515. 8	2517. 1	15. 600
15. 700	2517. 1	2518. 4	2519. 7	2521. 0	2522. 3	2523. 6	2524. 8	2526. 1	2527. 4	2528. 7	2530. 0	15. 700
15. 800	2530. 0	2531. 3	2532. 6	2533. 9	2535. 2	2536. 5	2537. 8	2539. 1	2540. 4	2541. 7	2543. 0	15. 800
15. 900	2543. 0	2544. 3	2545. 6	2546. 9	2548. 2	2549. 5	2550. 8	2552. 1	2553. 4	2554. 7	2556. 0	15. 900
16. 000	2556. 0	2557. 3	2558. 6	2559. 9	2561. 2	2562. 5	2563. 7	2565. 0	2566. 3	2567. 6	2568. 9	16. 000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 14. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts
Degrees F												
16. 000	2556. 0	2557. 3	2558. 6	2559. 9	2561. 2	2562. 5	2563. 7	2565. 0	2566. 3	2567. 6	2568. 9	16. 000
16. 100	2568. 9	2570. 2	2571. 5	2572. 8	2574. 1	2575. 4	2576. 7	2578. 0	2579. 3	2580. 6	2581. 9	16. 100
16. 200	2581. 9	2583. 2	2584. 5	2585. 8	2587. 1	2588. 4	2589. 6	2590. 9	2592. 2	2593. 5	2594. 8	16. 200
16. 300	2594. 8	2596. 1	2597. 4	2598. 7	2600. 0	2601. 3	2602. 6	2603. 9	2605. 2	2606. 5	2607. 8	16. 300
16. 400	2607. 8	2609. 1	2610. 4	2611. 7	2613. 0	2614. 3	2615. 6	2616. 9	2618. 2	2619. 5	2620. 8	16. 400
16. 500	2620. 8	2622. 1	2623. 4	2624. 7	2626. 0	2627. 3	2628. 5	2629. 8	2631. 1	2632. 4	2633. 7	16. 500
16. 600	2633. 7	2635. 0	2636. 3	2637. 6	2638. 9	2640. 2	2641. 5	2642. 8	2644. 1	2645. 4	2646. 7	16. 600
16. 700	2646. 7	2648. 0	2649. 3	2650. 6	2651. 9	2653. 2	2654. 4	2655. 7	2657. 0	2658. 3	2659. 6	16. 700
16. 800	2659. 6	2660. 9	2662. 2	2663. 5	2664. 8	2666. 1	2667. 4	2668. 7	2670. 0	2671. 3	2672. 6	16. 800
16. 900	2672. 6	2673. 9	2675. 2	2676. 5	2677. 8	2679. 2	2680. 5	2681. 8	2683. 1	2684. 4	2685. 7	16. 900
17. 000	2685. 7	2687. 0	2688. 3	2689. 6	2690. 9	2692. 2	2693. 5	2694. 8	2696. 1	2697. 4	2698. 8	17. 000
17. 100	2698. 8	2700. 0	2701. 3	2702. 6	2703. 9	2705. 3	2706. 6	2707. 9	2709. 2	2710. 5	2711. 8	17. 100
17. 200	2711. 8	2713. 1	2714. 4	2715. 7	2717. 0	2718. 3	2719. 6	2720. 9	2722. 2	2723. 5	2724. 9	17. 200
17. 300	2724. 9	2726. 1	2727. 4	2728. 7	2730. 0	2731. 4	2732. 7	2734. 0	2735. 3	2736. 6	2737. 9	17. 300
17. 400	2737. 9	2739. 2	2740. 5	2741. 8	2743. 1	2744. 4	2745. 7	2747. 0	2748. 3	2749. 6	2751. 0	17. 400
17. 500	2751. 0	2752. 2	2753. 5	2754. 8	2756. 1	2757. 5	2758. 8	2760. 1	2761. 4	2762. 7	2764. 0	17. 500
17. 600	2764. 0	2765. 3	2766. 6	2767. 9	2769. 2	2770. 5	2771. 8	2773. 1	2774. 4	2775. 7	2777. 0	17. 600
17. 700	2777. 0	2778. 3	2779. 6	2780. 9	2782. 2	2783. 6	2784. 9	2786. 2	2787. 5	2788. 8	2790. 1	17. 700
17. 800	2790. 1	2791. 4	2792. 7	2794. 1	2795. 4	2796. 7	2798. 0	2799. 3	2800. 7	2802. 0	2803. 3	17. 800
17. 900	2803. 3	2804. 6	2805. 9	2807. 2	2808. 5	2809. 9	2811. 2	2812. 5	2813. 8	2815. 1	2816. 4	17. 900
18. 000	2816. 4	2817. 7	2819. 0	2820. 4	2821. 7	2823. 0	2824. 3	2825. 6	2827. 0	2828. 3	2829. 6	18. 000
18. 100	2829. 6	2830. 9	2832. 2	2833. 5	2834. 8	2836. 2	2837. 5	2838. 8	2840. 1	2841. 4	2842. 7	18. 100
18. 200	2842. 7	2844. 0	2845. 3	2846. 6	2847. 9	2849. 3	2850. 6	2851. 9	2853. 2	2854. 5	2855. 8	18. 200
18. 300	2855. 8	2857. 1	2858. 5	2859. 8	2861. 1	2862. 4	2863. 7	2865. 0	2866. 4	2867. 7	2869. 0	18. 300
18. 400	2869. 0	2870. 3	2871. 6	2872. 9	2874. 2	2875. 6	2876. 9	2878. 2	2879. 5	2880. 8	2882. 1	18. 400
18. 500	2882. 1	2883. 4	2884. 7	2886. 0	2887. 4	2888. 7	2890. 0	2891. 3	2892. 7	2894. 0	2895. 3	18. 500
18. 600	2895. 3	2896. 6	2897. 9	2899. 2	2900. 5	2901. 9	2903. 2	2904. 5	2905. 8	2907. 1	2908. 4	18. 600
18. 700	2908. 4	2909. 7	2911. 0	2912. 4	2913. 7	2915. 0	2916. 3	2917. 6	2918. 9	2920. 2	2921. 5	18. 700
18. 800	2921. 5	2922. 8	2924. 1	2925. 5	2926. 8	2928. 1	2929. 4	2930. 7	2932. 1	2933. 4	2934. 7	18. 800
18. 900	2934. 7	2936. 0	2937. 3	2938. 7	2940. 0	2941. 3	2942. 6	2943. 9	2945. 3	2946. 6	2947. 9	18. 900
19. 000	2947. 9	2949. 2	2950. 5	2951. 9	2953. 2	2954. 5	2955. 8	2957. 1	2958. 5	2959. 8	2961. 1	19. 000
19. 100	2961. 1	2962. 4	2963. 7	2965. 1	2966. 4	2967. 7	2969. 0	2970. 3	2971. 7	2973. 0	2974. 3	19. 100
19. 200	2974. 3	2975. 6	2977. 0	2978. 3	2979. 6	2981. 0	2982. 3	2983. 6	2984. 9	2986. 3	2987. 6	19. 200
19. 300	2987. 6	2988. 9	2990. 2	2991. 6	2992. 9	2994. 2	2995. 5	2996. 8	2998. 2	2999. 5	3000. 8	19. 300
19. 400	3000. 8	3002. 1	3003. 4	3004. 8	3006. 1	3007. 4	3008. 7	3010. 0	3011. 4	3012. 7	3014. 0	19. 400
19. 500	3014. 0	3015. 3	3016. 6	3018. 0	3019. 3	3020. 6	3021. 9	3023. 2	3024. 6	3025. 9	3027. 2	19. 500
19. 600	3027. 2	3028. 5	3029. 8	3031. 2	3032. 5	3033. 8	3035. 1	3036. 4	3037. 8	3039. 1	3040. 4	19. 600
19. 700	3040. 4	3041. 7	3043. 0	3044. 4	3045. 7	3047. 0	3048. 3	3049. 6	3051. 0	3052. 3	3053. 6	19. 700
19. 800	3053. 6	3054. 9	3056. 2	3057. 6	3058. 9	3060. 2	3061. 5	3062. 8	3064. 2	3065. 5	3066. 8	19. 800
19. 900	3066. 8	3068. 1	3069. 5	3070. 8	3072. 1	3073. 5	3074. 8	3076. 1	3077. 4	3078. 8	3080. 1	19. 900
20. 000	3080. 1	3081. 4	3082. 8	3084. 1	3085. 4	3086. 8	3088. 1	3089. 4	3090. 7	3092. 0	3093. 4	20. 000
Millivolts	.000	.010	.020	.030	.040	.050	.060	.070	.080	.090	.100	Millivolts

\*Based on the International Temperature Scale of 1948.

# Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
30	-----	-----	0.000	0.003	0.006	0.009	0.012	0.015	0.018	0.021	0.024	30
40	0.024	0.027	.030	.033	.036	.039	.042	.045	.048	.052	.055	40
50	.055	.058	.061	.064	.068	.071	.074	.077	.080	.083	.086	50
60	.086	.090	.093	.096	.099	.103	.106	.109	.112	.116	.119	60
70	.119	.122	.126	.129	.132	.135	.139	.142	.145	.149	.152	70
80	.152	.155	.159	.162	.165	.169	.172	.175	.179	.182	.186	80
90	.186	.189	.192	.196	.199	.203	.206	.210	.213	.217	.220	90
100	.220	.224	.227	.230	.234	.237	.241	.244	.248	.251	.255	100
110	.255	.258	.262	.265	.269	.272	.276	.280	.284	.287	.291	110
120	.291	.294	.298	.301	.305	.308	.312	.316	.319	.323	.327	120
130	.327	.330	.334	.337	.341	.345	.349	.352	.356	.359	.363	130
140	.363	.367	.370	.374	.378	.381	.385	.389	.393	.397	.400	140
150	.400	.404	.408	.411	.415	.419	.423	.427	.431	.435	.438	150
160	.438	.442	.446	.450	.453	.457	.461	.465	.469	.473	.476	160
170	.476	.480	.484	.488	.492	.496	.500	.504	.508	.512	.516	170
180	.516	.520	.524	.528	.532	.536	.540	.544	.548	.552	.556	180
190	.556	.560	.564	.568	.572	.576	.580	.584	.588	.592	.596	190
200	.596	.600	.604	.608	.612	.616	.620	.625	.629	.633	.637	200
210	.637	.641	.645	.649	.653	.657	.662	.666	.670	.674	.678	210
220	.678	.683	.687	.691	.695	.700	.704	.708	.712	.716	.721	220
230	.721	.725	.729	.734	.738	.742	.746	.750	.755	.759	.763	230
240	.763	.767	.772	.776	.780	.785	.789	.793	.798	.802	.807	240
250	.807	.811	.815	.820	.824	.828	.833	.837	.842	.846	.850	250
260	.850	.855	.859	.863	.868	.872	.877	.881	.886	.890	.894	260
270	.894	.899	.904	.908	.912	.917	.921	.926	.930	.935	.939	270
280	.939	.944	.948	.953	.957	.962	.966	.971	.975	.980	.984	280
290	.984	.989	.993	.998	1.002	1.007	1.011	1.016	1.020	1.025	1.030	290
300	1.030	1.034	1.039	1.043	1.048	1.052	1.057	1.061	1.066	1.071	1.075	300
310	1.075	1.080	1.084	1.089	1.094	1.098	1.103	1.107	1.112	1.117	1.121	310
320	1.121	1.126	1.130	1.135	1.140	1.144	1.149	1.153	1.158	1.163	1.167	320
330	1.167	1.172	1.176	1.181	1.186	1.191	1.195	1.200	1.205	1.210	1.214	330
340	1.214	1.219	1.223	1.228	1.233	1.238	1.242	1.247	1.252	1.257	1.261	340
350	1.261	1.266	1.271	1.276	1.280	1.285	1.290	1.295	1.300	1.304	1.309	350
360	1.309	1.314	1.319	1.323	1.328	1.333	1.338	1.343	1.348	1.352	1.357	360
370	1.357	1.362	1.367	1.372	1.377	1.381	1.386	1.391	1.396	1.401	1.406	370
380	1.406	1.410	1.415	1.420	1.425	1.430	1.435	1.440	1.445	1.450	1.455	380
390	1.455	1.460	1.465	1.470	1.475	1.480	1.484	1.489	1.494	1.499	1.504	390
400	1.504	1.509	1.514	1.519	1.524	1.529	1.533	1.538	1.543	1.548	1.553	400
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
Millivolts												
400	1.504	1.509	1.514	1.519	1.524	1.529	1.533	1.538	1.543	1.548	1.553	400
410	1.553	1.558	1.563	1.568	1.573	1.578	1.583	1.588	1.593	1.598	1.603	410
420	1.603	1.608	1.613	1.618	1.623	1.628	1.633	1.638	1.643	1.648	1.653	420
430	1.653	1.658	1.663	1.668	1.673	1.678	1.683	1.688	1.693	1.698	1.703	430
440	1.703	1.708	1.713	1.719	1.724	1.729	1.734	1.739	1.744	1.749	1.754	440
450	1.754	1.759	1.764	1.769	1.774	1.779	1.785	1.790	1.795	1.800	1.805	450
460	1.805	1.811	1.816	1.821	1.826	1.831	1.836	1.841	1.846	1.851	1.856	460
470	1.856	1.862	1.867	1.872	1.877	1.882	1.887	1.892	1.898	1.903	1.908	470
480	1.908	1.913	1.918	1.924	1.929	1.934	1.939	1.944	1.950	1.955	1.960	480
490	1.960	1.965	1.970	1.976	1.981	1.986	1.991	1.996	2.002	2.007	2.012	490
500	2.012	2.017	2.023	2.028	2.033	2.038	2.044	2.049	2.054	2.059	2.065	500
510	2.065	2.070	2.075	2.081	2.086	2.091	2.096	2.101	2.107	2.112	2.117	510
520	2.117	2.123	2.128	2.133	2.139	2.144	2.149	2.154	2.160	2.165	2.170	520
530	2.170	2.176	2.181	2.186	2.192	2.197	2.202	2.207	2.213	2.218	2.223	530
540	2.223	2.229	2.234	2.239	2.245	2.250	2.255	2.261	2.266	2.271	2.277	540
550	2.277	2.282	2.287	2.293	2.298	2.303	2.308	2.314	2.319	2.325	2.330	550
560	2.330	2.335	2.341	2.346	2.352	2.357	2.363	2.368	2.373	2.379	2.384	560
570	2.384	2.389	2.395	2.401	2.406	2.412	2.417	2.423	2.428	2.433	2.438	570
580	2.438	2.444	2.449	2.455	2.460	2.466	2.471	2.477	2.482	2.487	2.493	580
590	2.493	2.498	2.504	2.509	2.515	2.520	2.526	2.531	2.537	2.542	2.547	590
600	2.547	2.553	2.558	2.564	2.569	2.575	2.580	2.586	2.591	2.597	2.602	600
610	2.602	2.608	2.613	2.619	2.624	2.630	2.635	2.641	2.646	2.652	2.657	610
620	2.657	2.663	2.668	2.674	2.679	2.685	2.690	2.696	2.701	2.707	2.712	620
630	2.712	2.718	2.723	2.729	2.734	2.740	2.746	2.751	2.757	2.762	2.768	630
640	2.768	2.773	2.779	2.784	2.790	2.796	2.801	2.807	2.812	2.818	2.823	640
650	2.823	2.829	2.834	2.840	2.846	2.851	2.857	2.862	2.868	2.873	2.879	650
660	2.879	2.884	2.890	2.896	2.901	2.907	2.912	2.918	2.923	2.929	2.935	660
670	2.935	2.940	2.946	2.952	2.957	2.963	2.968	2.974	2.979	2.985	2.991	670
680	2.991	2.997	3.002	3.008	3.013	3.019	3.024	3.030	3.036	3.041	3.047	680
690	3.047	3.053	3.058	3.064	3.069	3.075	3.081	3.087	3.092	3.098	3.103	690
700	3.103	3.109	3.115	3.120	3.126	3.132	3.137	3.143	3.148	3.154	3.160	700
710	3.160	3.166	3.171	3.177	3.182	3.188	3.194	3.199	3.205	3.211	3.217	710
720	3.217	3.222	3.228	3.234	3.239	3.245	3.251	3.256	3.262	3.268	3.273	720
730	3.273	3.279	3.285	3.291	3.296	3.302	3.308	3.313	3.319	3.325	3.330	730
740	3.330	3.336	3.342	3.348	3.353	3.359	3.365	3.370	3.376	3.382	3.387	740
750	3.387	3.393	3.399	3.405	3.411	3.416	3.422	3.428	3.433	3.439	3.445	750
760	3.445	3.451	3.456	3.462	3.468	3.473	3.479	3.485	3.491	3.497	3.502	760
770	3.502	3.508	3.514	3.519	3.525	3.531	3.537	3.543	3.549	3.554	3.560	770
780	3.560	3.566	3.572	3.577	3.583	3.589	3.595	3.601	3.607	3.612	3.618	780
790	3.618	3.624	3.630	3.635	3.641	3.647	3.653	3.659	3.665	3.671	3.677	790
800	3.677	3.682	3.688	3.694	3.700	3.706	3.712	3.718	3.723	3.729	3.735	800
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.

**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
800	3.677	3.682	3.688	3.694	3.700	3.706	3.712	3.718	3.723	3.729	3.735	800
810	3.735	3.741	3.746	3.752	3.758	3.764	3.770	3.776	3.782	3.788	3.794	810
820	3.794	3.799	3.805	3.811	3.817	3.823	3.829	3.835	3.841	3.846	3.852	820
830	3.852	3.858	3.864	3.870	3.876	3.882	3.888	3.894	3.899	3.905	3.911	830
840	3.911	3.917	3.923	3.929	3.935	3.941	3.946	3.952	3.958	3.964	3.970	840
850	3.970	3.976	3.982	3.988	3.994	3.999	4.005	4.011	4.017	4.023	4.029	850
860	4.029	4.035	4.041	4.047	4.052	4.058	4.064	4.070	4.075	4.081	4.087	860
870	4.087	4.093	4.099	4.105	4.111	4.116	4.122	4.128	4.134	4.140	4.146	870
880	4.146	4.152	4.158	4.164	4.169	4.175	4.181	4.187	4.193	4.199	4.205	880
890	4.205	4.211	4.217	4.223	4.229	4.235	4.241	4.246	4.252	4.258	4.264	890
900	4.264	4.270	4.276	4.282	4.288	4.294	4.300	4.306	4.312	4.318	4.324	900
910	4.324	4.330	4.336	4.342	4.348	4.354	4.360	4.366	4.372	4.378	4.384	910
920	4.384	4.389	4.395	4.401	4.407	4.413	4.419	4.425	4.431	4.437	4.443	920
930	4.443	4.449	4.455	4.461	4.467	4.473	4.479	4.485	4.491	4.497	4.503	930
940	4.503	4.509	4.515	4.521	4.527	4.533	4.539	4.545	4.551	4.557	4.563	940
950	4.563	4.569	4.575	4.581	4.587	4.593	4.599	4.605	4.612	4.618	4.624	950
960	4.624	4.630	4.636	4.642	4.648	4.654	4.660	4.666	4.672	4.679	4.685	960
970	4.685	4.691	4.697	4.703	4.709	4.715	4.721	4.727	4.733	4.740	4.746	970
980	4.746	4.752	4.758	4.764	4.770	4.776	4.782	4.788	4.794	4.801	4.807	980
990	4.807	4.813	4.819	4.825	4.831	4.837	4.844	4.850	4.856	4.862	4.868	990
1,000	4.868	4.874	4.881	4.887	4.893	4.899	4.905	4.911	4.917	4.924	4.930	1,000
1,010	4.930	4.936	4.942	4.948	4.954	4.960	4.966	4.972	4.979	4.985	4.991	1,010
1,020	4.991	4.998	5.004	5.010	5.016	5.022	5.028	5.034	5.041	5.047	5.053	1,020
1,030	5.053	5.059	5.066	5.072	5.078	5.084	5.090	5.096	5.102	5.109	5.115	1,030
1,040	5.115	5.121	5.127	5.133	5.139	5.146	5.152	5.158	5.164	5.170	5.176	1,040
1,050	5.176	5.182	5.189	5.195	5.201	5.208	5.214	5.220	5.226	5.232	5.238	1,050
1,060	5.238	5.244	5.251	5.257	5.263	5.270	5.276	5.282	5.288	5.294	5.301	1,060
1,070	5.301	5.307	5.313	5.319	5.326	5.332	5.338	5.344	5.351	5.357	5.363	1,070
1,080	5.363	5.369	5.376	5.382	5.388	5.394	5.401	5.407	5.413	5.419	5.426	1,080
1,090	5.426	5.432	5.438	5.444	5.450	5.457	5.463	5.469	5.476	5.482	5.488	1,090
1,100	5.488	5.494	5.501	5.507	5.513	5.519	5.526	5.532	5.538	5.544	5.551	1,100
1,110	5.551	5.557	5.563	5.570	5.576	5.582	5.589	5.595	5.601	5.607	5.614	1,110
1,120	5.614	5.620	5.626	5.633	5.639	5.645	5.652	5.658	5.664	5.671	5.677	1,120
1,130	5.677	5.684	5.690	5.696	5.703	5.709	5.716	5.722	5.728	5.734	5.741	1,130
1,140	5.741	5.747	5.753	5.760	5.766	5.773	5.779	5.786	5.792	5.798	5.805	1,140
1,150	5.805	5.811	5.817	5.824	5.830	5.837	5.843	5.849	5.856	5.862	5.869	1,150
1,160	5.869	5.875	5.881	5.888	5.894	5.901	5.907	5.913	5.920	5.926	5.933	1,160
1,170	5.933	5.939	5.945	5.952	5.958	5.964	5.971	5.977	5.983	5.990	5.996	1,170
1,180	5.996	6.003	6.009	6.015	6.022	6.028	6.035	6.041	6.047	6.054	6.060	1,180
1,190	6.060	6.067	6.073	6.079	6.086	6.092	6.099	6.105	6.111	6.118	6.125	1,190
1,200	6.125	6.131	6.137	6.143	6.150	6.156	6.163	6.169	6.175	6.182	6.188	1,200
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
1, 200	6. 125	6. 131	6. 137	6. 143	6. 150	6. 156	6. 163	6. 169	6. 175	6. 182	6. 188	1, 200
1, 210	6. 188	6. 195	6. 201	6. 207	6. 214	6. 220	6. 227	6. 233	6. 239	6. 246	6. 252	1, 210
1, 220	6. 252	6. 259	6. 265	6. 272	6. 278	6. 285	6. 291	6. 298	6. 304	6. 310	6. 317	1, 220
1, 230	6. 317	6. 323	6. 329	6. 336	6. 342	6. 349	6. 355	6. 362	6. 368	6. 375	6. 381	1, 230
1, 240	6. 381	6. 388	6. 394	6. 401	6. 407	6. 414	6. 420	6. 427	6. 433	6. 440	6. 446	1, 240
1, 250	6. 446	6. 453	6. 459	6. 466	6. 472	6. 479	6. 485	6. 492	6. 498	6. 505	6. 511	1, 250
1, 260	6. 511	6. 518	6. 524	6. 531	6. 537	6. 544	6. 550	6. 557	6. 563	6. 570	6. 577	1, 260
1, 270	6. 577	6. 583	6. 589	6. 596	6. 602	6. 609	6. 616	6. 622	6. 629	6. 635	6. 642	1, 270
1, 280	6. 642	6. 648	6. 655	6. 661	6. 668	6. 674	6. 681	6. 687	6. 694	6. 701	6. 707	1, 280
1, 290	6. 707	6. 714	6. 720	6. 727	6. 733	6. 740	6. 746	6. 753	6. 759	6. 766	6. 773	1, 290
1, 300	6. 773	6. 779	6. 786	6. 792	6. 799	6. 805	6. 812	6. 818	6. 825	6. 832	6. 838	1, 300
1, 310	6. 838	6. 845	6. 851	6. 858	6. 865	6. 871	6. 877	6. 884	6. 891	6. 898	6. 904	1, 310
1, 320	6. 904	6. 911	6. 917	6. 924	6. 931	6. 937	6. 943	6. 950	6. 957	6. 964	6. 970	1, 320
1, 330	6. 970	6. 977	6. 983	6. 990	6. 997	7. 003	7. 010	7. 017	7. 023	7. 030	7. 037	1, 330
1, 340	7. 037	7. 043	7. 049	7. 056	7. 063	7. 069	7. 076	7. 083	7. 089	7. 096	7. 103	1, 340
1, 350	7. 103	7. 109	7. 116	7. 123	7. 129	7. 136	7. 143	7. 149	7. 155	7. 162	7. 169	1, 350
1, 360	7. 169	7. 175	7. 182	7. 189	7. 195	7. 202	7. 209	7. 215	7. 222	7. 229	7. 235	1, 360
1, 370	7. 235	7. 242	7. 249	7. 255	7. 262	7. 269	7. 275	7. 282	7. 289	7. 295	7. 302	1, 370
1, 380	7. 302	7. 309	7. 315	7. 322	7. 329	7. 336	7. 342	7. 349	7. 356	7. 362	7. 369	1, 380
1, 390	7. 369	7. 376	7. 382	7. 389	7. 396	7. 403	7. 409	7. 416	7. 423	7. 429	7. 436	1, 390
1, 400	7. 436	7. 443	7. 449	7. 456	7. 463	7. 470	7. 477	7. 483	7. 490	7. 497	7. 503	1, 400
1, 410	7. 503	7. 510	7. 517	7. 523	7. 530	7. 537	7. 544	7. 551	7. 557	7. 564	7. 571	1, 410
1, 420	7. 571	7. 578	7. 585	7. 591	7. 598	7. 605	7. 611	7. 618	7. 625	7. 632	7. 639	1, 420
1, 430	7. 639	7. 645	7. 652	7. 659	7. 665	7. 672	7. 679	7. 686	7. 693	7. 699	7. 706	1, 430
1, 440	7. 706	7. 713	7. 720	7. 727	7. 733	7. 740	7. 747	7. 754	7. 761	7. 767	7. 774	1, 440
1, 450	7. 774	7. 781	7. 788	7. 795	7. 801	7. 808	7. 815	7. 822	7. 829	7. 835	7. 842	1, 450
1, 460	7. 842	7. 849	7. 856	7. 863	7. 870	7. 877	7. 884	7. 891	7. 897	7. 904	7. 911	1, 460
1, 470	7. 911	7. 918	7. 924	7. 931	7. 938	7. 945	7. 952	7. 959	7. 965	7. 972	7. 979	1, 470
1, 480	7. 979	7. 986	7. 993	7. 999	8. 006	8. 013	8. 020	8. 027	8. 033	8. 040	8. 047	1, 480
1, 490	8. 047	8. 054	8. 061	8. 068	8. 075	8. 081	8. 089	8. 095	8. 102	8. 109	8. 116	1, 490
1, 500	8. 116	8. 123	8. 129	8. 136	8. 143	8. 150	8. 157	8. 163	8. 170	8. 177	8. 184	1, 500
1, 510	8. 184	8. 191	8. 198	8. 205	8. 212	8. 218	8. 225	8. 232	8. 239	8. 246	8. 253	1, 510
1, 520	8. 253	8. 260	8. 267	8. 274	8. 281	8. 287	8. 294	8. 301	8. 308	8. 315	8. 322	1, 520
1, 530	8. 322	8. 329	8. 336	8. 343	8. 350	8. 356	8. 363	8. 370	8. 377	8. 384	8. 391	1, 530
1, 540	8. 391	8. 398	8. 405	8. 412	8. 419	8. 426	8. 433	8. 439	8. 446	8. 453	8. 460	1, 540
1, 550	8. 460	8. 467	8. 474	8. 481	8. 488	8. 495	8. 502	8. 509	8. 516	8. 523	8. 530	1, 550
1, 560	8. 530	8. 537	8. 544	8. 551	8. 558	8. 565	8. 571	8. 578	8. 585	8. 592	8. 599	1, 560
1, 570	8. 599	8. 606	8. 613	8. 620	8. 627	8. 634	8. 641	8. 648	8. 655	8. 662	8. 669	1, 570
1, 580	8. 669	8. 676	8. 683	8. 690	8. 697	8. 704	8. 711	8. 718	8. 725	8. 732	8. 739	1, 580
1, 590	8. 739	8. 746	8. 753	8. 760	8. 767	8. 774	8. 781	8. 788	8. 795	8. 802	8. 809	1, 590
1, 600	8. 809	8. 816	8. 823	8. 830	8. 837	8. 844	8. 851	8. 858	8. 865	8. 872	8. 879	1, 600
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.



**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
1, 600	8. 809	8. 816	8. 823	8. 830	8. 837	8. 844	8. 851	8. 858	8. 865	8. 872	8. 879	1, 600
1, 610	8. 879	8. 886	8. 893	8. 900	8. 907	8. 914	8. 921	8. 928	8. 935	8. 942	8. 949	1, 610
1, 620	8. 949	8. 956	8. 963	8. 970	8. 977	8. 984	8. 991	8. 998	9. 005	9. 012	9. 019	1, 620
1, 630	9. 019	9. 026	9. 033	9. 040	9. 047	9. 054	9. 061	9. 068	9. 075	9. 082	9. 090	1, 630
1, 640	9. 090	9. 097	9. 104	9. 111	9. 118	9. 125	9. 132	9. 139	9. 146	9. 153	9. 161	1, 640
1, 650	9. 161	9. 168	9. 175	9. 182	9. 189	9. 196	9. 203	9. 210	9. 218	9. 225	9. 232	1, 650
1, 660	9. 232	9. 239	9. 246	9. 253	9. 260	9. 267	9. 274	9. 281	9. 289	9. 296	9. 303	1, 660
1, 670	9. 303	9. 310	9. 317	9. 324	9. 331	9. 338	9. 345	9. 353	9. 360	9. 367	9. 374	1, 670
1, 680	9. 374	9. 381	9. 388	9. 395	9. 402	9. 409	9. 416	9. 424	9. 431	9. 438	9. 445	1, 680
1, 690	9. 445	9. 452	9. 459	9. 466	9. 474	9. 481	9. 488	9. 495	9. 502	9. 509	9. 516	1, 690
1, 700	9. 516	9. 523	9. 531	9. 538	9. 545	9. 552	9. 559	9. 566	9. 573	9. 580	9. 587	1, 700
1, 710	9. 587	9. 594	9. 602	9. 609	9. 616	9. 623	9. 630	9. 637	9. 644	9. 651	9. 659	1, 710
1, 720	9. 659	9. 666	9. 673	9. 680	9. 687	9. 694	9. 701	9. 709	9. 716	9. 723	9. 730	1, 720
1, 730	9. 730	9. 737	9. 744	9. 751	9. 759	9. 766	9. 773	9. 780	9. 787	9. 794	9. 802	1, 730
1, 740	9. 802	9. 809	9. 816	9. 823	9. 830	9. 838	9. 845	9. 852	9. 859	9. 866	9. 874	1, 740
1, 750	9. 874	9. 881	9. 888	9. 895	9. 902	9. 910	9. 917	9. 924	9. 931	9. 939	9. 946	1, 750
1, 760	9. 946	9. 953	9. 961	9. 968	9. 975	9. 982	9. 990	9. 997	10. 004	10. 012	10. 019	1, 760
1, 770	10. 019	10. 026	10. 034	10. 041	10. 048	10. 056	10. 063	10. 070	10. 077	10. 084	10. 092	1, 770
1, 780	10. 092	10. 099	10. 106	10. 114	10. 121	10. 129	10. 136	10. 143	10. 150	10. 157	10. 164	1, 780
1, 790	10. 164	10. 172	10. 179	10. 186	10. 194	10. 201	10. 208	10. 215	10. 223	10. 230	10. 237	1, 790
1, 800	10. 237	10. 244	10. 251	10. 259	10. 266	10. 274	10. 281	10. 288	10. 296	10. 303	10. 310	1, 800
1, 810	10. 310	10. 318	10. 325	10. 332	10. 339	10. 347	10. 354	10. 361	10. 369	10. 376	10. 383	1, 810
1, 820	10. 383	10. 391	10. 398	10. 405	10. 412	10. 420	10. 427	10. 434	10. 441	10. 449	10. 456	1, 820
1, 830	10. 456	10. 464	10. 471	10. 478	10. 485	10. 493	10. 500	10. 507	10. 514	10. 522	10. 529	1, 830
1, 840	10. 529	10. 537	10. 544	10. 551	10. 559	10. 566	10. 574	10. 581	10. 588	10. 596	10. 603	1, 840
1, 850	10. 603	10. 610	10. 618	10. 625	10. 632	10. 639	10. 647	10. 654	10. 661	10. 669	10. 676	1, 850
1, 860	10. 676	10. 683	10. 691	10. 698	10. 705	10. 712	10. 720	10. 727	10. 735	10. 742	10. 749	1, 860
1, 870	10. 749	10. 757	10. 764	10. 771	10. 779	10. 786	10. 794	10. 801	10. 809	10. 816	10. 823	1, 870
1, 880	10. 823	10. 831	10. 839	10. 846	10. 854	10. 861	10. 869	10. 876	10. 884	10. 891	10. 898	1, 880
1, 890	10. 898	10. 906	10. 914	10. 921	10. 929	10. 936	10. 944	10. 951	10. 959	10. 966	10. 973	1, 890
1, 900	10. 973	10. 981	10. 988	10. 996	11. 003	11. 011	11. 018	11. 026	11. 033	11. 040	11. 048	1, 900
1, 910	11. 048	11. 055	11. 063	11. 070	11. 078	11. 085	11. 093	11. 100	11. 108	11. 115	11. 122	1, 910
1, 920	11. 122	11. 130	11. 138	11. 145	11. 153	11. 160	11. 168	11. 175	11. 183	11. 190	11. 197	1, 920
1, 930	11. 197	11. 205	11. 213	11. 220	11. 228	11. 235	11. 243	11. 250	11. 258	11. 265	11. 273	1, 930
1, 940	11. 273	11. 280	11. 288	11. 295	11. 303	11. 310	11. 318	11. 325	11. 333	11. 340	11. 348	1, 940
1, 950	11. 348	11. 355	11. 363	11. 371	11. 379	11. 385	11. 393	11. 401	11. 408	11. 416	11. 424	1, 950
1, 960	11. 424	11. 431	11. 439	11. 446	11. 454	11. 461	11. 468	11. 476	11. 484	11. 492	11. 499	1, 960
1, 970	11. 499	11. 507	11. 515	11. 522	11. 529	11. 537	11. 544	11. 552	11. 560	11. 568	11. 575	1, 970
1, 980	11. 575	11. 582	11. 590	11. 598	11. 605	11. 613	11. 620	11. 628	11. 636	11. 643	11. 651	1, 980
1, 990	11. 651	11. 658	11. 666	11. 674	11. 681	11. 689	11. 696	11. 704	11. 712	11. 719	11. 726	1, 990
2, 000	11. 726	11. 734	11. 742	11. 749	11. 757	11. 765	11. 772	11. 779	11. 787	11. 795	11. 802	2, 000
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
<b>2,000</b>	11.726	11.734	11.742	11.749	11.757	11.765	11.772	11.779	11.787	11.795	11.802	<b>2,000</b>
<b>2,010</b>	11.802	11.810	11.817	11.825	11.832	11.840	11.848	11.855	11.863	11.871	11.878	<b>2,010</b>
<b>2,020</b>	11.878	11.885	11.893	11.901	11.908	11.916	11.924	11.931	11.938	11.946	11.954	<b>2,020</b>
<b>2,030</b>	11.954	11.961	11.969	11.976	11.984	11.992	11.999	12.007	12.014	12.022	12.029	<b>2,030</b>
<b>2,040</b>	12.029	12.037	12.045	12.052	12.060	12.068	12.075	12.082	12.090	12.098	12.105	<b>2,040</b>
<b>2,050</b>	12.105	12.113	12.121	12.128	12.136	12.144	12.151	12.159	12.166	12.174	12.182	<b>2,050</b>
<b>2,060</b>	12.182	12.189	12.197	12.205	12.212	12.220	12.227	12.235	12.243	12.250	12.258	<b>2,060</b>
<b>2,070</b>	12.258	12.265	12.273	12.281	12.288	12.296	12.304	12.312	12.319	12.327	12.335	<b>2,070</b>
<b>2,080</b>	12.335	12.342	12.350	12.358	12.365	12.373	12.381	12.388	12.396	12.403	12.411	<b>2,080</b>
<b>2,090</b>	12.411	12.419	12.427	12.434	12.442	12.450	12.458	12.465	12.473	12.480	12.488	<b>2,090</b>
<b>2,100</b>	12.488	12.495	12.503	12.511	12.518	12.526	12.534	12.541	12.549	12.557	12.564	<b>2,100</b>
<b>2,110</b>	12.564	12.572	12.579	12.587	12.595	12.602	12.610	12.618	12.625	12.633	12.641	<b>2,110</b>
<b>2,120</b>	12.641	12.648	12.656	12.664	12.672	12.679	12.687	12.695	12.702	12.710	12.718	<b>2,120</b>
<b>2,130</b>	12.718	12.725	12.733	12.741	12.748	12.756	12.764	12.772	12.779	12.787	12.795	<b>2,130</b>
<b>2,140</b>	12.795	12.802	12.810	12.818	12.825	12.833	12.841	12.848	12.856	12.864	12.871	<b>2,140</b>
<b>2,150</b>	12.871	12.879	12.887	12.894	12.902	12.909	12.917	12.925	12.932	12.940	12.948	<b>2,150</b>
<b>2,160</b>	12.948	12.955	12.963	12.971	12.978	12.986	12.994	13.002	13.009	13.017	13.025	<b>2,160</b>
<b>2,170</b>	13.025	13.032	13.040	13.048	13.055	13.063	13.071	13.078	13.086	13.094	13.102	<b>2,170</b>
<b>2,180</b>	13.102	13.109	13.117	13.125	13.132	13.140	13.148	13.155	13.163	13.170	13.178	<b>2,180</b>
<b>2,190</b>	13.178	13.186	13.193	13.201	13.208	13.216	13.224	13.232	13.239	13.247	13.255	<b>2,190</b>
<b>2,200</b>	13.255	13.263	13.270	13.278	13.285	13.293	13.301	13.309	13.316	13.324	13.332	<b>2,200</b>
<b>2,210</b>	13.332	13.340	13.347	13.355	13.363	13.371	13.378	13.386	13.394	13.402	13.409	<b>2,210</b>
<b>2,220</b>	13.409	13.417	13.425	13.432	13.440	13.448	13.455	13.463	13.471	13.479	13.486	<b>2,220</b>
<b>2,230</b>	13.486	13.494	13.502	13.509	13.517	13.525	13.532	13.540	13.548	13.556	13.564	<b>2,230</b>
<b>2,240</b>	13.564	13.571	13.579	13.587	13.595	13.602	13.610	13.618	13.625	13.633	13.641	<b>2,240</b>
<b>2,250</b>	13.641	13.648	13.656	13.664	13.672	13.679	13.687	13.695	13.702	13.710	13.718	<b>2,250</b>
<b>2,260</b>	13.718	13.725	13.733	13.741	13.749	13.756	13.764	13.772	13.779	13.787	13.795	<b>2,260</b>
<b>2,270</b>	13.795	13.802	13.810	13.818	13.826	13.833	13.841	13.849	13.857	13.865	13.872	<b>2,270</b>
<b>2,280</b>	13.872	13.880	13.888	13.895	13.903	13.911	13.918	13.926	13.934	13.942	13.949	<b>2,280</b>
<b>2,290</b>	13.949	13.957	13.965	13.972	13.980	13.988	13.995	14.003	14.011	14.019	14.027	<b>2,290</b>
<b>2,300</b>	14.027	14.034	14.042	14.050	14.058	14.065	14.073	14.081	14.088	14.096	14.104	<b>2,300</b>
<b>2,310</b>	14.104	14.111	14.119	14.127	14.135	14.142	14.150	14.158	14.165	14.173	14.181	<b>2,310</b>
<b>2,320</b>	14.181	14.188	14.196	14.204	14.212	14.219	14.227	14.235	14.242	14.250	14.258	<b>2,320</b>
<b>2,330</b>	14.258	14.265	14.273	14.281	14.288	14.296	14.304	14.312	14.319	14.327	14.335	<b>2,330</b>
<b>2,340</b>	14.335	14.342	14.350	14.358	14.366	14.374	14.382	14.389	14.397	14.405	14.412	<b>2,340</b>
<b>2,350</b>	14.412	14.420	14.428	14.435	14.443	14.451	14.459	14.467	14.475	14.482	14.490	<b>2,350</b>
<b>2,360</b>	14.490	14.498	14.505	14.513	14.521	14.528	14.536	14.544	14.552	14.560	14.567	<b>2,360</b>
<b>2,370</b>	14.567	14.575	14.583	14.591	14.598	14.606	14.614	14.621	14.629	14.637	14.644	<b>2,370</b>
<b>2,380</b>	14.644	14.652	14.660	14.668	14.675	14.683	14.691	14.698	14.706	14.714	14.721	<b>2,380</b>
<b>2,390</b>	14.721	14.729	14.737	14.745	14.752	14.760	14.768	14.775	14.783	14.791	14.798	<b>2,390</b>
<b>2,400</b>	14.798	14.806	14.814	14.822	14.829	14.837	14.845	14.852	14.860	14.868	14.875	<b>2,400</b>
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
2,400	14.798	14.806	14.814	14.822	14.829	14.837	14.845	14.852	14.860	14.868	14.875	2,400
2,410	14.875	14.883	14.891	14.898	14.906	14.914	14.922	14.929	14.937	14.945	14.952	2,410
2,420	14.952	14.960	14.968	14.975	14.983	14.991	14.999	15.006	15.014	15.022	15.029	2,420
2,430	15.029	15.037	15.045	15.052	15.060	15.068	15.076	15.084	15.091	15.099	15.107	2,430
2,440	15.107	15.115	15.122	15.130	15.138	15.145	15.153	15.161	15.168	15.176	15.184	2,440
2,450	15.184	15.192	15.199	15.207	15.215	15.222	15.230	15.238	15.245	15.253	15.261	2,450
2,460	15.261	15.268	15.276	15.284	15.292	15.299	15.307	15.315	15.322	15.330	15.338	2,460
2,470	15.338	15.345	15.353	15.361	15.369	15.377	15.385	15.392	15.400	15.408	15.415	2,470
2,480	15.415	15.423	15.431	15.438	15.446	15.454	15.462	15.469	15.477	15.484	15.492	2,480
2,490	15.492	15.500	15.508	15.515	15.523	15.531	15.538	15.546	15.553	15.561	15.568	2,490
2,500	15.568	15.576	15.584	15.592	15.599	15.607	15.615	15.623	15.630	15.638	15.645	2,500
2,510	15.645	15.653	15.661	15.668	15.676	15.684	15.692	15.700	15.707	15.715	15.722	2,510
2,520	15.722	15.730	15.738	15.745	15.753	15.761	15.769	15.777	15.785	15.792	15.800	2,520
2,530	15.800	15.808	15.815	15.823	15.831	15.838	15.846	15.854	15.862	15.869	15.877	2,530
2,540	15.877	15.885	15.892	15.900	15.908	15.915	15.923	15.931	15.938	15.946	15.954	2,540
2,550	15.954	15.962	15.969	15.977	15.985	15.992	16.000	16.008	16.015	16.023	16.031	2,550
2,560	16.031	16.039	16.046	16.054	16.062	16.070	16.078	16.085	16.093	16.101	16.108	2,560
2,570	16.108	16.116	16.124	16.132	16.139	16.147	16.155	16.163	16.170	16.178	16.185	2,570
2,580	16.185	16.193	16.201	16.208	16.216	16.224	16.232	16.240	16.247	16.255	16.263	2,580
2,590	16.263	16.271	16.278	16.286	16.294	16.301	16.309	16.317	16.325	16.332	16.340	2,590
2,600	16.340	16.348	16.355	16.363	16.371	16.378	16.386	16.394	16.402	16.409	16.417	2,600
2,610	16.417	16.425	16.432	16.440	16.448	16.455	16.463	16.471	16.478	16.486	16.494	2,610
2,620	16.494	16.502	16.509	16.517	16.524	16.532	16.540	16.548	16.556	16.564	16.571	2,620
2,630	16.571	16.579	16.586	16.594	16.602	16.610	16.618	16.625	16.633	16.641	16.648	2,630
2,640	16.648	16.656	16.663	16.671	16.679	16.687	16.695	16.702	16.710	16.718	16.725	2,640
2,650	16.725	16.733	16.741	16.748	16.756	16.764	16.772	16.780	16.788	16.795	16.802	2,650
2,660	16.802	16.810	16.818	16.826	16.834	16.842	16.849	16.857	16.865	16.872	16.880	2,660
2,670	16.880	16.887	16.895	16.903	16.911	16.918	16.926	16.933	16.941	16.949	16.957	2,670
2,680	16.957	16.964	16.972	16.979	16.987	16.995	17.002	17.010	17.018	17.025	17.033	2,680
2,690	17.033	17.041	17.048	17.056	17.064	17.072	17.079	17.087	17.095	17.102	17.110	2,690
2,700	17.110	17.118	17.125	17.133	17.141	17.148	17.156	17.163	17.171	17.179	17.186	2,700
2,710	17.186	17.194	17.202	17.209	17.217	17.225	17.232	17.240	17.248	17.255	17.263	2,710
2,720	17.263	17.271	17.278	17.286	17.294	17.301	17.309	17.317	17.325	17.332	17.340	2,720
2,730	17.340	17.347	17.355	17.363	17.370	17.378	17.385	17.393	17.401	17.408	17.416	2,730
2,740	17.416	17.424	17.432	17.439	17.447	17.455	17.462	17.470	17.478	17.485	17.493	2,740
2,750	17.493	17.500	17.508	17.516	17.524	17.532	17.539	17.546	17.554	17.562	17.569	2,750
2,760	17.569	17.577	17.585	17.592	17.600	17.608	17.615	17.623	17.631	17.638	17.646	2,760
2,770	17.646	17.654	17.662	17.669	17.677	17.685	17.692	17.700	17.708	17.715	17.723	2,770
2,780	17.723	17.731	17.738	17.746	17.753	17.761	17.768	17.776	17.784	17.792	17.799	2,780
2,790	17.799	17.807	17.814	17.822	17.830	17.837	17.845	17.852	17.860	17.868	17.875	2,790
2,800	17.875	17.882	17.890	17.898	17.906	17.913	17.921	17.928	17.936	17.944	17.951	2,800
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 15. Platinum Versus Platinum-13-Percent Rhodium Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
Millivolts												
2,800	17.875	17.882	17.890	17.898	17.906	17.913	17.921	17.928	17.936	17.944	17.951	2,800
2,810	17.951	17.958	17.966	17.974	17.982	17.989	17.997	18.004	18.012	18.020	18.027	2,810
2,820	18.027	18.035	18.043	18.050	18.058	18.065	18.073	18.080	18.088	18.096	18.103	2,820
2,830	18.103	18.111	18.119	18.126	18.134	18.141	18.149	18.156	18.164	18.172	18.179	2,830
2,840	18.179	18.187	18.195	18.202	18.210	18.218	18.225	18.233	18.240	18.248	18.255	2,840
2,850	18.255	18.263	18.271	18.278	18.286	18.294	18.301	18.309	18.316	18.324	18.332	2,850
2,860	18.332	18.339	18.347	18.355	18.362	18.370	18.377	18.385	18.392	18.400	18.408	2,860
2,870	18.408	18.415	18.423	18.431	18.438	18.446	18.453	18.461	18.468	18.476	18.484	2,870
2,880	18.484	18.492	18.499	18.507	18.514	18.522	18.529	18.537	18.545	18.552	18.560	2,880
2,890	18.560	18.568	18.575	18.583	18.590	18.598	18.605	18.613	18.621	18.628	18.636	2,890
2,900	18.636	18.644	18.651	18.659	18.666	18.674	18.681	18.689	18.697	18.705	18.712	2,900
2,910	18.712	18.720	18.727	18.735	18.743	18.750	18.758	18.765	18.773	18.781	18.788	2,910
2,920	18.788	18.796	18.803	18.811	18.819	18.826	18.834	18.842	18.849	18.857	18.864	2,920
2,930	18.864	18.872	18.879	18.887	18.895	18.902	18.910	18.918	18.925	18.932	18.940	2,930
2,940	18.940	18.948	18.955	18.963	18.971	18.978	18.986	18.993	19.001	19.008	19.016	2,940
2,950	19.016	19.024	19.031	19.039	19.046	19.054	19.062	19.069	19.077	19.084	19.092	2,950
2,960	19.092	19.099	19.107	19.115	19.122	19.129	19.137	19.145	19.152	19.160	19.168	2,960
2,970	19.168	19.175	19.182	19.190	19.198	19.205	19.213	19.220	19.228	19.235	19.243	2,970
2,980	19.243	19.250	19.258	19.265	19.273	19.281	19.288	19.295	19.303	19.311	19.318	2,980
2,990	19.318	19.326	19.333	19.341	19.348	19.356	19.364	19.371	19.378	19.386	19.394	2,990
3,000	19.394	19.402	19.409	19.417	19.424	19.432	19.439	19.447	19.454	19.462	19.470	3,000
3,010	19.470	19.477	19.485	19.492	19.500	19.508	19.515	19.523	19.530	19.538	19.545	3,010
3,020	19.545	19.553	19.561	19.568	19.576	19.583	19.591	19.598	19.606	19.614	19.621	3,020
3,030	19.621	19.628	19.636	19.644	19.651	19.659	19.667	19.674	19.682	19.689	19.697	3,030
3,040	19.697	19.704	19.712	19.720	19.727	19.735	19.742	19.750	19.758	19.765	19.773	3,040
3,050	19.773	19.780	19.788	19.795	19.803	19.811	19.818	19.826	19.833	19.841	19.848	3,050
3,060	19.848	19.856	19.864	19.871	19.878	19.886	19.894	19.902	19.909	19.916	19.924	3,060
3,070	19.924	19.932	19.939	19.947	19.954	19.962	19.969	19.977	19.984	19.992	19.999	3,070
3,080	19.999	20.007	20.014	20.022	20.029	20.037	20.044	20.052	20.059	20.067	20.075	3,080
3,090	20.075	20.082	20.090	20.097	20.105	20.112	20.120	20.127	20.135	20.142	20.150	3,090
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.

# Table 16. Chromel-Alumel Thermocouples

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts
Degrees F												
-5.00	-253	-262	-270	-280	-289	-299	-310	-----	-----	-----	-----	-5.00
-4.00	-180	-187	-193	-200	-207	-215	-222	-229	-237	-245	-253	-4.00
-3.00	-119	-125	-131	-137	-143	-149	-155	-161	-167	-174	-180	-3.00
-2.00	-65	-70	-76	-81	-86	-92	-97	-103	-108	-114	-119	-2.00
-1.00	-15	-20	-25	-30	-35	-40	-45	-50	-55	-60	-65	-1.00
(-)0.00	32	27	23	18	14	9	4	-1	-6	-11	-15	(-)0.00
(+)0.00	32	37	41	46	50	55	59	64	68	73	77	(+)0.00
1.00	77	82	86	90	95	99	104	108	113	117	121	1.00
2.00	121	126	130	134	139	143	147	152	156	160	165	2.00
3.00	165	169	173	178	182	186	191	195	199	203	208	3.00
4.00	208	212	216	221	225	230	234	238	243	247	251	4.00
5.00	251	256	260	265	269	273	278	282	287	291	296	5.00
6.00	296	300	305	309	314	318	323	327	332	336	341	6.00
7.00	341	345	350	355	359	364	368	372	377	381	386	7.00
8.00	386	390	395	400	404	408	413	417	422	426	431	8.00
9.00	431	435	440	444	449	453	457	462	466	471	475	9.00
10.00	475	480	484	488	493	497	501	506	510	515	519	10.00
11.00	519	524	528	532	536	541	545	550	554	558	563	11.00
12.00	563	567	572	576	580	585	589	593	598	602	606	12.00
13.00	606	610	615	619	624	628	632	636	641	645	649	13.00
14.00	649	653	658	662	667	671	675	680	684	688	692	14.00
15.00	692	697	701	705	709	714	718	722	727	731	735	15.00
16.00	735	739	743	748	752	756	761	765	769	773	778	16.00
17.00	778	782	786	790	795	799	803	807	812	816	820	17.00
18.00	820	824	829	833	837	842	846	850	854	858	862	18.00
19.00	862	867	871	875	880	884	888	892	896	901	905	19.00
20.00	905	909	913	917	922	926	930	934	939	943	947	20.00
21.00	947	951	955	960	964	968	972	977	981	985	989	21.00
22.00	989	993	998	1,002	1,006	1,010	1,014	1,019	1,023	1,027	1,031	22.00
23.00	1,031	1,036	1,040	1,044	1,048	1,052	1,057	1,061	1,065	1,069	1,074	23.00
24.00	1,074	1,078	1,082	1,086	1,090	1,094	1,099	1,103	1,107	1,112	1,116	24.00
25.00	1,116	1,120	1,124	1,128	1,133	1,137	1,141	1,145	1,149	1,154	1,158	25.00
26.00	1,158	1,162	1,166	1,171	1,175	1,179	1,184	1,188	1,192	1,196	1,201	26.00
27.00	1,201	1,205	1,209	1,213	1,218	1,222	1,226	1,231	1,235	1,239	1,243	27.00
28.00	1,243	1,248	1,252	1,256	1,260	1,265	1,269	1,273	1,278	1,282	1,286	28.00
29.00	1,286	1,290	1,295	1,299	1,303	1,308	1,312	1,316	1,321	1,325	1,329	29.00
30.00	1,329	1,333	1,338	1,342	1,346	1,351	1,355	1,359	1,364	1,368	1,372	30.00
Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 16. Chromel-Alumel Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts
Degrees F												
30.00	1,329	1,333	1,338	1,342	1,346	1,351	1,355	1,359	1,364	1,368	1,372	30.00
31.00	1,372	1,376	1,381	1,385	1,389	1,394	1,398	1,402	1,407	1,411	1,415	31.00
32.00	1,415	1,420	1,424	1,428	1,433	1,437	1,441	1,446	1,450	1,454	1,459	32.00
33.00	1,459	1,463	1,468	1,472	1,476	1,481	1,485	1,490	1,494	1,499	1,503	33.00
34.00	1,503	1,507	1,512	1,516	1,520	1,525	1,529	1,534	1,538	1,543	1,547	34.00
35.00	1,547	1,551	1,556	1,560	1,565	1,569	1,573	1,578	1,582	1,587	1,591	35.00
36.00	1,591	1,596	1,600	1,605	1,609	1,614	1,618	1,623	1,627	1,632	1,636	36.00
37.00	1,636	1,641	1,645	1,650	1,654	1,659	1,663	1,667	1,672	1,676	1,681	37.00
38.00	1,681	1,685	1,690	1,694	1,699	1,703	1,708	1,712	1,717	1,721	1,726	38.00
39.00	1,726	1,731	1,735	1,740	1,744	1,749	1,753	1,758	1,762	1,767	1,772	39.00
40.00	1,772	1,776	1,781	1,785	1,790	1,794	1,799	1,804	1,808	1,813	1,818	40.00
41.00	1,818	1,822	1,827	1,832	1,836	1,841	1,845	1,850	1,854	1,859	1,864	41.00
42.00	1,864	1,868	1,873	1,877	1,882	1,887	1,892	1,896	1,901	1,906	1,911	42.00
43.00	1,911	1,915	1,920	1,924	1,929	1,934	1,938	1,943	1,948	1,952	1,957	43.00
44.00	1,957	1,962	1,967	1,971	1,976	1,981	1,985	1,990	1,995	2,000	2,004	44.00
45.00	2,004	2,009	2,014	2,019	2,023	2,028	2,033	2,038	2,042	2,047	2,052	45.00
46.00	2,052	2,057	2,062	2,066	2,071	2,076	2,081	2,086	2,090	2,095	2,100	46.00
47.00	2,100	2,105	2,110	2,115	2,120	2,124	2,129	2,134	2,139	2,144	2,149	47.00
48.00	2,149	2,154	2,158	2,163	2,168	2,173	2,178	2,183	2,188	2,192	2,197	48.00
49.00	2,197	2,202	2,207	2,212	2,217	2,222	2,227	2,232	2,237	2,242	2,247	49.00
50.00	2,247	2,252	2,257	2,262	2,267	2,272	2,277	2,282	2,287	2,292	2,297	50.00
51.00	2,297	2,302	2,307	2,313	2,318	2,323	2,328	2,333	2,338	2,343	2,348	51.00
52.00	2,348	2,354	2,359	2,364	2,369	2,374	2,379	2,384	2,390	2,395	2,400	52.00
53.00	2,400	2,405	2,410	2,415	2,420	2,426	2,431	2,436	2,441	2,446	2,452	53.00
54.00	2,452	2,457	2,462	2,467	2,473	2,478	2,483	2,489	2,494	2,499	2,505	54.00
Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
-300	-5.51	-5.52	-5.53	-5.54	-5.54	-5.55	-5.56	-5.57	-5.58	-5.59	-5.60	-300
-290	-5.41	-5.42	-5.43	-5.44	-5.45	-5.46	-5.47	-5.48	-5.49	-5.50	-5.51	-290
-280	-5.30	-5.31	-5.32	-5.34	-5.35	-5.36	-5.37	-5.38	-5.39	-5.40	-5.41	-280
-270	-5.20	-5.21	-5.22	-5.23	-5.24	-5.25	-5.26	-5.27	-5.28	-5.29	-5.30	-270
-260	-5.08	-5.09	-5.10	-5.12	-5.13	-5.14	-5.15	-5.16	-5.17	-5.18	-5.20	-260
-250	-4.96	-4.97	-4.99	-5.00	-5.01	-5.02	-5.03	-5.04	-5.06	-5.07	-5.08	-250
-240	-4.84	-4.85	-4.86	-4.88	-4.89	-4.90	-4.91	-4.92	-4.94	-4.95	-4.96	-240
-230	-4.71	-4.72	-4.74	-4.75	-4.76	-4.77	-4.79	-4.80	-4.81	-4.82	-4.84	-230
-220	-4.58	-4.59	-4.60	-4.62	-4.63	-4.64	-4.66	-4.67	-4.68	-4.70	-4.71	-220
-210	-4.44	-4.45	-4.46	-4.48	-4.49	-4.51	-4.52	-4.53	-4.55	-4.56	-4.58	-210
-200	-4.29	-4.31	-4.32	-4.34	-4.35	-4.36	-4.38	-4.39	-4.41	-4.42	-4.44	-200
-190	-4.15	-4.16	-4.18	-4.19	-4.21	-4.22	-4.24	-4.25	-4.26	-4.28	-4.29	-190
-180	-4.00	-4.01	-4.03	-4.04	-4.06	-4.07	-4.09	-4.10	-4.12	-4.13	-4.15	-180
-170	-3.84	-3.86	-3.88	-3.89	-3.91	-3.92	-3.94	-3.95	-3.97	-3.98	-4.00	-170
-160	-3.69	-3.70	-3.72	-3.73	-3.75	-3.76	-3.78	-3.80	-3.81	-3.83	-3.84	-160
-150	-3.52	-3.54	-3.56	-3.57	-3.59	-3.60	-3.62	-3.64	-3.65	-3.67	-3.69	-150
-140	-3.36	-3.38	-3.39	-3.41	-3.42	-3.44	-3.46	-3.47	-3.49	-3.51	-3.52	-140
-130	-3.19	-3.20	-3.22	-3.24	-3.25	-3.27	-3.29	-3.31	-3.32	-3.34	-3.36	-130
-120	-3.01	-3.03	-3.05	-3.06	-3.08	-3.10	-3.12	-3.13	-3.15	-3.17	-3.19	-120
-110	-2.83	-2.85	-2.87	-2.89	-2.90	-2.92	-2.94	-2.96	-2.98	-2.99	-3.01	-110
-100	-2.65	-2.67	-2.69	-2.71	-2.72	-2.74	-2.76	-2.78	-2.80	-2.82	-2.83	-100
-90	-2.47	-2.49	-2.50	-2.52	-2.54	-2.56	-2.58	-2.60	-2.62	-2.63	-2.65	-90
-80	-2.28	-2.30	-2.32	-2.34	-2.36	-2.37	-2.39	-2.41	-2.43	-2.45	-2.47	-80
-70	-2.09	-2.11	-2.13	-2.15	-2.17	-2.18	-2.20	-2.22	-2.24	-2.26	-2.28	-70
-60	-1.90	-1.92	-1.94	-1.96	-1.97	-1.99	-2.01	-2.03	-2.05	-2.07	-2.09	-60
-50	-1.70	-1.72	-1.74	-1.76	-1.78	-1.80	-1.82	-1.84	-1.86	-1.88	-1.90	-50
-40	-1.50	-1.52	-1.54	-1.56	-1.58	-1.60	-1.62	-1.64	-1.66	-1.68	-1.70	-40
-30	-1.30	-1.32	-1.34	-1.36	-1.38	-1.40	-1.42	-1.44	-1.46	-1.48	-1.50	-30
-20	-1.10	-1.12	-1.14	-1.16	-1.18	-1.20	-1.22	-1.24	-1.26	-1.28	-1.30	-20
-10	-0.89	-0.91	-0.93	-0.95	-0.97	-0.99	-1.01	-1.03	-1.06	-1.08	-1.10	-10
(-)0	-0.68	-0.70	-0.72	-0.75	-0.77	-0.79	-0.81	-0.83	-0.85	-0.87	-0.89	(-)0
(+)0	-0.68	-0.66	-0.64	-0.62	-0.60	-0.58	-0.56	-0.54	-0.52	-0.49	-0.47	(+)0
10	-0.47	-0.45	-0.43	-0.41	-0.39	-0.37	-0.34	-0.32	-0.30	-0.28	-0.26	10
20	-0.26	-0.24	-0.22	-0.19	-0.17	-0.15	-0.13	-0.11	-0.09	-0.07	-0.04	20
30	-0.04	-0.02	0.00	0.02	0.04	0.07	0.09	0.11	0.13	0.15	0.18	30
40	0.18	0.20	0.22	0.24	0.26	0.29	0.31	0.33	0.35	0.37	0.40	40
50	0.40	0.42	0.44	0.46	0.48	0.51	0.53	0.55	0.57	0.60	0.62	50
60	0.62	0.64	0.66	0.68	0.71	0.73	0.75	0.77	0.80	0.82	0.84	60
70	0.84	0.86	0.88	0.91	0.93	0.95	0.97	1.00	1.02	1.04	1.06	70
80	1.06	1.09	1.11	1.13	1.15	1.18	1.20	1.22	1.24	1.27	1.29	80
90	1.29	1.31	1.33	1.36	1.38	1.40	1.43	1.45	1.47	1.49	1.52	90
100	1.52	1.54	1.56	1.58	1.61	1.63	1.65	1.68	1.70	1.72	1.74	100
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
Millivolts												
100	1.52	1.54	1.56	1.58	1.61	1.63	1.65	1.68	1.70	1.72	1.74	100
110	1.74	1.77	1.79	1.81	1.84	1.86	1.88	1.90	1.93	1.95	1.97	110
120	1.97	2.00	2.02	2.04	2.06	2.09	2.11	2.13	2.16	2.18	2.20	120
130	2.20	2.23	2.25	2.27	2.29	2.32	2.34	2.36	2.39	2.41	2.43	130
140	2.43	2.46	2.48	2.50	2.52	2.55	2.57	2.59	2.62	2.64	2.66	140
150	2.66	2.69	2.71	2.73	2.75	2.78	2.80	2.82	2.85	2.87	2.89	150
160	2.89	2.92	2.94	2.96	2.98	3.01	3.03	3.05	3.08	3.10	3.12	160
170	3.12	3.15	3.17	3.19	3.22	3.24	3.26	3.29	3.31	3.33	3.36	170
180	3.36	3.38	3.40	3.43	3.45	3.47	3.49	3.52	3.54	3.56	3.59	180
190	3.59	3.61	3.63	3.66	3.68	3.70	3.73	3.75	3.77	3.80	3.82	190
200	3.82	3.84	3.87	3.89	3.91	3.94	3.96	3.98	4.01	4.03	4.05	200
210	4.05	4.08	4.10	4.12	4.15	4.17	4.19	4.21	4.24	4.26	4.28	210
220	4.28	4.31	4.33	4.35	4.38	4.40	4.42	4.44	4.47	4.49	4.51	220
230	4.51	4.54	4.56	4.58	4.61	4.63	4.65	4.67	4.70	4.72	4.74	230
240	4.74	4.77	4.79	4.81	4.83	4.86	4.88	4.90	4.92	4.95	4.97	240
250	4.97	4.99	5.02	5.04	5.06	5.08	5.11	5.13	5.15	5.17	5.20	250
260	5.20	5.22	5.24	5.26	5.29	5.31	5.33	5.35	5.38	5.40	5.42	260
270	5.42	5.44	5.47	5.49	5.51	5.53	5.56	5.58	5.60	5.62	5.65	270
280	5.65	5.67	5.69	5.71	5.73	5.76	5.78	5.80	5.82	5.85	5.87	280
290	5.87	5.89	5.91	5.93	5.96	5.98	6.00	6.02	6.05	6.07	6.09	290
300	6.09	6.11	6.13	6.16	6.18	6.20	6.22	6.25	6.27	6.29	6.31	300
310	6.31	6.33	6.36	6.38	6.40	6.42	6.45	6.47	6.49	6.51	6.53	310
320	6.53	6.56	6.58	6.60	6.62	6.65	6.67	6.69	6.71	6.73	6.76	320
330	6.76	6.78	6.80	6.82	6.84	6.87	6.89	6.91	6.93	6.96	6.98	330
340	6.98	7.00	7.02	7.04	7.07	7.09	7.11	7.13	7.15	7.18	7.20	340
350	7.20	7.22	7.24	7.26	7.29	7.31	7.33	7.35	7.38	7.40	7.42	350
360	7.42	7.44	7.46	7.49	7.51	7.53	7.55	7.58	7.60	7.62	7.64	360
370	7.64	7.66	7.69	7.71	7.73	7.75	7.78	7.80	7.82	7.84	7.87	370
380	7.87	7.89	7.91	7.93	7.95	7.98	8.00	8.02	8.04	8.07	8.09	380
390	8.09	8.11	8.13	8.16	8.18	8.20	8.22	8.24	8.27	8.29	8.31	390
400	8.31	8.33	8.36	8.38	8.40	8.42	8.45	8.47	8.49	8.51	8.54	400
410	8.54	8.56	8.58	8.60	8.62	8.65	8.67	8.69	8.71	8.74	8.76	410
420	8.76	8.78	8.80	8.82	8.85	8.87	8.89	8.91	8.94	8.96	8.98	420
430	8.98	9.00	9.03	9.05	9.07	9.09	9.12	9.14	9.16	9.18	9.21	430
440	9.21	9.23	9.25	9.27	9.30	9.32	9.34	9.36	9.39	9.41	9.43	440
450	9.43	9.45	9.48	9.50	9.52	9.54	9.57	9.59	9.61	9.63	9.66	450
460	9.66	9.68	9.70	9.73	9.75	9.77	9.79	9.82	9.84	9.86	9.88	460
470	9.88	9.91	9.93	9.95	9.97	10.00	10.02	10.04	10.06	10.09	10.11	470
480	10.11	10.13	10.16	10.18	10.20	10.22	10.25	10.27	10.29	10.31	10.34	480
490	10.34	10.36	10.38	10.40	10.43	10.45	10.47	10.50	10.52	10.54	10.57	490
500	10.57	10.59	10.61	10.63	10.66	10.68	10.70	10.72	10.75	10.77	10.79	500
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.



# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
	Millivolts											
500	10.57	10.59	10.61	10.63	10.66	10.68	10.70	10.72	10.75	10.77	10.79	500
510	10.79	10.82	10.84	10.86	10.88	10.91	10.93	10.95	10.98	11.00	11.02	510
520	11.02	11.04	11.07	11.09	11.11	11.13	11.16	11.18	11.20	11.23	11.25	520
530	11.25	11.27	11.29	11.32	11.34	11.36	11.39	11.41	11.43	11.45	11.48	530
540	11.48	11.50	11.52	11.55	11.57	11.59	11.61	11.64	11.66	11.68	11.71	540
550	11.71	11.73	11.75	11.78	11.80	11.82	11.84	11.87	11.89	11.91	11.94	550
560	11.94	11.96	11.98	12.01	12.03	12.05	12.07	12.10	12.12	12.14	12.17	560
570	12.17	12.19	12.21	12.24	12.26	12.28	12.30	12.33	12.35	12.37	12.40	570
580	12.40	12.42	12.44	12.47	12.49	12.51	12.53	12.56	12.58	12.60	12.63	580
590	12.63	12.65	12.67	12.70	12.72	12.74	12.76	12.79	12.81	12.83	12.86	590
600	12.86	12.88	12.90	12.93	12.95	12.97	13.00	13.02	13.04	13.06	13.09	600
610	13.09	13.11	13.13	13.16	13.18	13.20	13.23	13.25	13.27	13.30	13.32	610
620	13.32	13.34	13.36	13.39	13.41	13.44	13.46	13.48	13.50	13.53	13.55	620
630	13.55	13.57	13.60	13.62	13.64	13.67	13.69	13.71	13.74	13.76	13.78	630
640	13.78	13.81	13.83	13.85	13.88	13.90	13.92	13.95	13.97	13.99	14.02	640
650	14.02	14.04	14.06	14.09	14.11	14.13	14.15	14.18	14.20	14.22	14.25	650
660	14.25	14.27	14.29	14.32	14.34	14.36	14.39	14.41	14.43	14.46	14.48	660
670	14.48	14.50	14.53	14.55	14.57	14.60	14.62	14.64	14.67	14.69	14.71	670
680	14.71	14.74	14.76	14.78	14.81	14.83	14.85	14.88	14.90	14.92	14.95	680
690	14.95	14.97	14.99	15.02	15.04	15.06	15.09	15.11	15.13	15.16	15.18	690
700	15.18	15.20	15.23	15.25	15.27	15.30	15.32	15.34	15.37	15.39	15.41	700
710	15.41	15.44	15.46	15.48	15.51	15.53	15.55	15.58	15.60	15.62	15.65	710
720	15.65	15.67	15.69	15.72	15.74	15.76	15.79	15.81	15.83	15.86	15.88	720
730	15.88	15.90	15.93	15.95	15.98	16.00	16.02	16.05	16.07	16.09	16.12	730
740	16.12	16.14	16.16	16.19	16.21	16.23	16.26	16.28	16.30	16.33	16.35	740
750	16.35	16.37	16.40	16.42	16.45	16.47	16.49	16.52	16.54	16.56	16.59	750
760	16.59	16.61	16.63	16.66	16.68	16.70	16.73	16.75	16.77	16.80	16.82	760
770	16.82	16.84	16.87	16.89	16.92	16.94	16.96	16.99	17.01	17.03	17.06	770
780	17.06	17.08	17.10	17.13	17.15	17.17	17.20	17.22	17.24	17.27	17.29	780
790	17.29	17.31	17.34	17.36	17.39	17.41	17.43	17.46	17.48	17.50	17.53	790
800	17.53	17.55	17.57	17.60	17.62	17.64	17.67	17.69	17.71	17.74	17.76	800
810	17.76	17.78	17.81	17.83	17.86	17.88	17.90	17.93	17.95	17.97	18.00	810
820	18.00	18.02	18.04	18.07	18.09	18.11	18.14	18.16	18.18	18.21	18.23	820
830	18.23	18.25	18.28	18.30	18.33	18.35	18.37	18.40	18.42	18.44	18.47	830
840	18.47	18.49	18.51	18.54	18.56	18.58	18.61	18.63	18.65	18.68	18.70	840
850	18.70	18.73	18.75	18.77	18.80	18.82	18.84	18.87	18.89	18.91	18.94	850
860	18.94	18.96	18.99	19.01	19.03	19.06	19.08	19.10	19.13	19.15	19.18	860
870	19.18	19.20	19.22	19.25	19.27	19.29	19.32	19.34	19.36	19.39	19.41	870
880	19.41	19.44	19.46	19.48	19.51	19.53	19.55	19.58	19.60	19.63	19.65	880
890	19.65	19.67	19.70	19.72	19.75	19.77	19.79	19.82	19.84	19.86	19.89	890
900	19.89	19.91	19.94	19.96	19.98	20.01	20.03	20.05	20.08	20.10	20.13	900
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
900	19.89	19.91	19.94	19.96	19.98	20.01	20.03	20.05	20.08	20.10	20.13	900
910	20.13	20.15	20.17	20.20	20.22	20.24	20.27	20.29	20.32	20.34	20.36	910
920	20.36	20.39	20.41	20.43	20.46	20.48	20.50	20.53	20.55	20.58	20.60	920
930	20.60	20.62	20.65	20.67	20.69	20.72	20.74	20.76	20.79	20.81	20.84	930
940	20.84	20.86	20.88	20.91	20.93	20.95	20.98	21.00	21.03	21.05	21.07	940
950	21.07	21.10	21.12	21.14	21.17	21.19	21.21	21.24	21.26	21.28	21.31	950
960	21.31	21.33	21.36	21.38	21.40	21.43	21.45	21.47	21.50	21.52	21.54	960
970	21.54	21.57	21.59	21.62	21.64	21.66	21.69	21.71	21.73	21.76	21.78	970
980	21.78	21.81	21.83	21.85	21.88	21.90	21.92	21.95	21.97	21.99	22.02	980
990	22.02	22.04	22.07	22.09	22.11	22.14	22.16	22.18	22.21	22.23	22.26	990
1,000	22.26	22.28	22.30	22.33	22.35	22.37	22.40	22.42	22.44	22.47	22.49	1,000
1,010	22.49	22.52	22.54	22.56	22.59	22.61	22.63	22.66	22.68	22.71	22.73	1,010
1,020	22.73	22.75	22.78	22.80	22.82	22.85	22.87	22.90	22.92	22.94	22.97	1,020
1,030	22.97	22.99	23.01	23.04	23.06	23.08	23.11	23.13	23.16	23.18	23.20	1,030
1,040	23.20	23.23	23.25	23.27	23.30	23.32	23.35	23.37	23.39	23.42	23.44	1,040
1,050	23.44	23.46	23.49	23.51	23.54	23.56	23.58	23.61	23.63	23.65	23.68	1,050
1,060	23.68	23.70	23.72	23.75	23.77	23.80	23.82	23.84	23.87	23.89	23.91	1,060
1,070	23.91	23.94	23.96	23.99	24.01	24.03	24.06	24.08	24.10	24.13	24.15	1,070
1,080	24.15	24.18	24.20	24.22	24.25	24.27	24.29	24.32	24.34	24.36	24.39	1,080
1,090	24.39	24.41	24.44	24.46	24.49	24.51	24.53	24.55	24.58	24.60	24.63	1,090
1,100	24.63	24.65	24.67	24.70	24.72	24.74	24.77	24.79	24.82	24.84	24.86	1,100
1,110	24.86	24.89	24.91	24.93	24.96	24.98	25.01	25.03	25.05	25.08	25.10	1,110
1,120	25.10	25.12	25.15	25.17	25.20	25.22	25.24	25.27	25.29	25.31	25.34	1,120
1,130	25.34	25.36	25.38	25.41	25.43	25.46	25.48	25.50	25.52	25.55	25.57	1,130
1,140	25.57	25.60	25.62	25.65	25.67	25.69	25.72	25.74	25.76	25.79	25.81	1,140
1,150	25.81	25.83	25.86	25.88	25.91	25.93	25.95	25.98	26.00	26.02	26.05	1,150
1,160	26.05	26.07	26.09	26.12	26.14	26.16	26.19	26.21	26.24	26.26	26.28	1,160
1,170	26.28	26.31	26.33	26.35	26.38	26.40	26.42	26.45	26.47	26.49	26.52	1,170
1,180	26.52	26.54	26.56	26.59	26.61	26.63	26.66	26.68	26.70	26.73	26.75	1,180
1,190	26.75	26.77	26.80	26.82	26.85	26.87	26.89	26.91	26.94	26.96	26.98	1,190
1,200	26.98	27.01	27.03	27.06	27.08	27.10	27.12	27.15	27.17	27.20	27.22	1,200
1,210	27.22	27.24	27.27	27.29	27.31	27.34	27.36	27.38	27.40	27.43	27.45	1,210
1,220	27.45	27.48	27.50	27.52	27.55	27.57	27.59	27.62	27.64	27.66	27.69	1,220
1,230	27.69	27.71	27.73	27.76	27.78	27.80	27.83	27.85	27.87	27.90	27.92	1,230
1,240	27.92	27.94	27.97	27.99	28.01	28.04	28.06	28.08	28.11	28.13	28.15	1,240
1,250	28.15	28.18	28.20	28.22	28.25	28.27	28.29	28.32	28.34	28.37	28.39	1,250
1,260	28.39	28.41	28.44	28.46	28.48	28.50	28.53	28.55	28.58	28.60	28.62	1,260
1,270	28.62	28.65	28.67	28.69	28.72	28.74	28.76	28.79	28.81	28.83	28.86	1,270
1,280	28.86	28.88	28.90	28.93	28.95	28.97	29.00	29.02	29.04	29.07	29.09	1,280
1,290	29.09	29.11	29.14	29.16	29.18	29.21	29.23	29.25	29.28	29.30	29.32	1,290
1,300	29.32	29.35	29.37	29.39	29.42	29.44	29.46	29.49	29.51	29.53	29.56	1,300
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
	Millivolts											
1,300	29.32	29.35	29.37	29.39	29.42	29.44	29.46	29.49	29.51	29.53	29.56	1,300
1,310	29.56	29.58	29.60	29.63	29.65	29.67	29.70	29.72	29.74	29.77	29.79	1,310
1,320	29.79	29.81	29.84	29.86	29.88	29.91	29.93	29.95	29.97	30.00	30.02	1,320
1,330	30.02	30.05	30.07	30.09	30.11	30.14	30.16	30.18	30.21	30.23	30.25	1,330
1,340	30.25	30.28	30.30	30.32	30.35	30.37	30.39	30.42	30.44	30.46	30.49	1,340
1,350	30.49	30.51	30.53	30.56	30.58	30.60	30.63	30.65	30.67	30.70	30.72	1,350
1,360	30.72	30.74	30.77	30.79	30.81	30.83	30.86	30.88	30.90	30.93	30.95	1,360
1,370	30.95	30.97	31.00	31.02	31.04	31.07	31.09	31.11	31.14	31.16	31.18	1,370
1,380	31.18	31.21	31.23	31.25	31.28	31.30	31.32	31.34	31.37	31.39	31.42	1,380
1,390	31.42	31.44	31.46	31.48	31.51	31.53	31.55	31.58	31.60	31.62	31.65	1,390
1,400	31.65	31.67	31.69	31.72	31.74	31.76	31.78	31.81	31.83	31.85	31.88	1,400
1,410	31.88	31.90	31.92	31.95	31.97	31.99	32.02	32.04	32.06	32.08	32.11	1,410
1,420	32.11	32.13	32.15	32.18	32.20	32.22	32.25	32.27	32.29	32.31	32.34	1,420
1,430	32.34	32.36	32.38	32.41	32.43	32.45	32.48	32.50	32.52	32.54	32.57	1,430
1,440	32.57	32.59	32.61	32.64	32.66	32.68	32.70	32.73	32.75	32.77	32.80	1,440
1,450	32.80	32.82	32.84	32.86	32.89	32.91	32.93	32.96	32.98	33.00	33.02	1,450
1,460	33.02	33.05	33.07	33.09	33.12	33.14	33.16	33.18	33.21	33.23	33.25	1,460
1,470	33.25	33.28	33.30	33.32	33.34	33.37	33.39	33.41	33.43	33.46	33.48	1,470
1,480	33.48	33.50	33.53	33.55	33.57	33.59	33.62	33.64	33.66	33.69	33.71	1,480
1,490	33.71	33.73	33.75	33.78	33.80	33.82	33.84	33.87	33.89	33.91	33.93	1,490
1,500	33.93	33.96	33.98	34.00	34.03	34.05	34.07	34.09	34.12	34.14	34.16	1,500
1,510	34.16	34.18	34.21	34.23	34.25	34.28	34.30	34.32	34.34	34.37	34.39	1,510
1,520	34.39	34.41	34.43	34.46	34.48	34.50	34.53	34.55	34.57	34.59	34.62	1,520
1,530	34.62	34.64	34.66	34.68	34.71	34.73	34.75	34.77	34.80	34.82	34.84	1,530
1,540	34.84	34.87	34.89	34.91	34.93	34.96	34.98	35.00	35.02	35.05	35.07	1,540
1,550	35.07	35.09	35.11	35.14	35.16	35.18	35.21	35.23	35.25	35.27	35.29	1,550
1,560	35.29	35.32	35.34	35.36	35.39	35.41	35.43	35.45	35.48	35.50	35.52	1,560
1,570	35.52	35.54	35.57	35.59	35.61	35.63	35.66	35.68	35.70	35.72	35.75	1,570
1,580	35.75	35.77	35.79	35.81	35.84	35.86	35.88	35.90	35.93	35.95	35.97	1,580
1,590	35.97	35.99	36.02	36.04	36.06	36.08	36.11	36.13	36.15	36.17	36.19	1,590
1,600	36.19	36.22	36.24	36.26	36.29	36.31	36.33	36.35	36.37	36.40	36.42	1,600
1,610	36.42	36.44	36.46	36.49	36.51	36.53	36.55	36.58	36.60	36.62	36.64	1,610
1,620	36.64	36.67	36.69	36.71	36.73	36.76	36.78	36.80	36.82	36.84	36.87	1,620
1,630	36.87	36.89	36.91	36.93	36.96	36.98	37.00	37.02	37.05	37.07	37.09	1,630
1,640	37.09	37.11	37.14	37.16	37.18	37.20	37.23	37.25	37.27	37.29	37.31	1,640
1,650	37.31	37.34	37.36	37.38	37.40	37.43	37.45	37.47	37.49	37.52	37.54	1,650
1,660	37.54	37.56	37.58	37.60	37.63	37.65	37.67	37.69	37.72	37.74	37.76	1,660
1,670	37.76	37.78	37.81	37.83	37.85	37.87	37.89	37.92	37.94	37.96	37.98	1,670
1,680	37.98	38.01	38.03	38.05	38.07	38.09	38.12	38.14	38.16	38.18	38.20	1,680
1,690	38.20	38.23	38.25	38.27	38.29	38.32	38.34	38.36	38.38	38.40	38.43	1,690
1,700	38.43	38.45	38.47	38.49	38.51	38.54	38.56	38.58	38.60	38.62	38.65	1,700
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 17. Chromel-Alumel Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
1,700	38.43	38.45	38.47	38.49	38.51	38.54	38.56	38.58	38.60	38.62	38.65	1,700
1,710	38.65	38.67	38.69	38.71	38.73	38.76	38.78	38.80	38.82	38.84	38.87	1,710
1,720	38.87	38.89	38.91	38.93	38.95	38.98	39.00	39.02	39.04	39.06	39.09	1,720
1,730	39.09	39.11	39.13	39.15	39.17	39.20	39.22	39.24	39.26	39.28	39.31	1,730
1,740	39.31	39.33	39.35	39.37	39.39	39.42	39.44	39.46	39.48	39.50	39.53	1,740
1,750	39.53	39.55	39.57	39.59	39.61	39.64	39.66	39.68	39.70	39.72	39.75	1,750
1,760	39.75	39.77	39.79	39.81	39.83	39.86	39.88	39.90	39.92	39.94	39.96	1,760
1,770	39.96	39.99	40.01	40.03	40.05	40.07	40.10	40.12	40.14	40.16	40.18	1,770
1,780	40.18	40.20	40.23	40.25	40.27	40.29	40.31	40.34	40.36	40.38	40.40	1,780
1,790	40.40	40.42	40.44	40.47	40.49	40.51	40.53	40.55	40.58	40.60	40.62	1,790
1,800	40.62	40.64	40.66	40.68	40.71	40.73	40.75	40.77	40.79	40.82	40.84	1,800
1,810	40.84	40.86	40.88	40.90	40.92	40.95	40.97	40.99	41.01	41.03	41.05	1,810
1,820	41.05	41.08	41.10	41.12	41.14	41.16	41.18	41.21	41.23	41.25	41.27	1,820
1,830	41.27	41.29	41.31	41.34	41.36	41.38	41.40	41.42	41.45	41.47	41.49	1,830
1,840	41.49	41.51	41.53	41.55	41.57	41.60	41.62	41.64	41.66	41.68	41.70	1,840
1,850	41.70	41.73	41.75	41.77	41.79	41.81	41.83	41.85	41.88	41.90	41.92	1,850
1,860	41.92	41.94	41.96	41.99	42.01	42.03	42.05	42.07	42.09	42.11	42.14	1,860
1,870	42.14	42.16	42.18	42.20	42.22	42.24	42.26	42.29	42.31	42.33	42.35	1,870
1,880	42.35	42.37	42.39	42.42	42.44	42.46	42.48	42.50	42.52	42.55	42.57	1,880
1,890	42.57	42.59	42.61	42.63	42.65	42.67	42.69	42.72	42.74	42.76	42.78	1,890
1,900	42.78	42.80	42.82	42.84	42.87	42.89	42.91	42.93	42.95	42.97	42.99	1,900
1,910	42.99	43.01	43.04	43.06	43.08	43.10	43.12	43.14	43.17	43.19	43.21	1,910
1,920	43.21	43.23	43.25	43.27	43.29	43.31	43.34	43.36	43.38	43.40	43.42	1,920
1,930	43.42	43.44	43.47	43.49	43.51	43.53	43.55	43.57	43.59	43.61	43.63	1,930
1,940	43.63	43.66	43.68	43.70	43.72	43.74	43.76	43.78	43.81	43.83	43.85	1,940
1,950	43.85	43.87	43.89	43.91	43.93	43.95	43.98	44.00	44.02	44.04	44.06	1,950
1,960	44.06	44.08	44.10	44.13	44.15	44.17	44.19	44.21	44.23	44.25	44.27	1,960
1,970	44.27	44.30	44.32	44.34	44.36	44.38	44.40	44.42	44.44	44.47	44.49	1,970
1,980	44.49	44.51	44.53	44.55	44.57	44.59	44.61	44.63	44.66	44.68	44.70	1,980
1,990	44.70	44.72	44.74	44.76	44.78	44.80	44.82	44.85	44.87	44.89	44.91	1,990
2,000	44.91	44.93	44.95	44.97	44.99	45.01	45.03	45.06	45.08	45.10	45.12	2,000
2,010	45.12	45.14	45.16	45.18	45.20	45.22	45.24	45.27	45.29	45.31	45.33	2,010
2,020	45.33	45.35	45.37	45.39	45.41	45.43	45.45	45.48	45.50	45.52	45.54	2,020
2,030	45.54	45.56	45.58	45.60	45.62	45.64	45.66	45.69	45.71	45.73	45.75	2,030
2,040	45.75	45.77	45.79	45.81	45.83	45.85	45.87	45.90	45.92	45.94	45.96	2,040
2,050	45.96	45.98	46.00	46.02	46.04	46.06	46.08	46.11	46.13	46.15	46.17	2,050
2,060	46.17	46.19	46.21	46.23	46.25	46.27	46.29	46.31	46.33	46.36	46.38	2,060
2,070	46.38	46.40	46.42	46.44	46.46	46.48	46.50	46.52	46.54	46.56	46.58	2,070
2,080	46.58	46.60	46.63	46.65	46.67	46.69	46.71	46.73	46.75	46.77	46.79	2,080
2,090	46.79	46.81	46.83	46.85	46.87	46.90	46.92	46.94	46.96	46.98	47.00	2,090
2,100	47.00	47.02	47.04	47.06	47.08	47.10	47.12	47.14	47.17	47.19	47.21	2,100
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

# Table 17. Chromel-Alumel Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
2, 100	47.00	47.02	47.04	47.06	47.08	47.10	47.12	47.14	47.17	47.19	47.21	2, 100
2, 110	47.21	47.23	47.25	47.27	47.29	47.31	47.33	47.35	47.37	47.39	47.41	2, 110
2, 120	47.41	47.43	47.45	47.47	47.49	47.52	47.54	47.56	47.58	47.60	47.62	2, 120
2, 130	47.62	47.64	47.66	47.68	47.70	47.72	47.74	47.76	47.78	47.80	47.82	2, 130
2, 140	47.82	47.84	47.86	47.89	47.91	47.93	47.95	47.97	47.99	48.01	48.03	2, 140
2, 150	48.03	48.05	48.07	48.09	48.11	48.13	48.15	48.17	48.19	48.21	48.23	2, 150
2, 160	48.23	48.25	48.27	48.29	48.32	48.34	48.36	48.38	48.40	48.42	48.44	2, 160
2, 170	48.44	48.46	48.48	48.50	48.52	48.54	48.56	48.58	48.60	48.62	48.64	2, 170
2, 180	48.64	48.66	48.68	48.70	48.72	48.74	48.76	48.79	48.81	48.83	48.85	2, 180
2, 190	48.85	48.87	48.89	48.91	48.93	48.95	48.97	48.99	49.01	49.03	49.05	2, 190
2, 200	49.05	49.07	49.09	49.11	49.13	49.15	49.17	49.19	49.21	49.23	49.25	2, 200
2, 210	49.25	49.27	49.29	49.31	49.33	49.35	49.37	49.39	49.41	49.43	49.45	2, 210
2, 220	49.45	49.47	49.49	49.51	49.53	49.55	49.57	49.59	49.61	49.63	49.65	2, 220
2, 230	49.65	49.67	49.69	49.71	49.73	49.76	49.78	49.80	49.82	49.84	49.86	2, 230
2, 240	49.86	49.88	49.90	49.92	49.94	49.96	49.98	50.00	50.02	50.04	50.06	2, 240
2, 250	50.06	50.08	50.10	50.12	50.14	50.16	50.18	50.20	50.22	50.24	50.26	2, 250
2, 260	50.26	50.28	50.30	50.32	50.34	50.36	50.38	50.40	50.42	50.44	50.46	2, 260
2, 270	50.46	50.48	50.50	50.52	50.54	50.56	50.57	50.59	50.61	50.63	50.65	2, 270
2, 280	50.65	50.67	50.69	50.71	50.73	50.75	50.77	50.79	50.81	50.83	50.85	2, 280
2, 290	50.85	50.87	50.89	50.91	50.93	50.95	50.97	50.99	51.01	51.03	51.05	2, 290
2, 300	51.05	51.07	51.09	51.11	51.13	51.15	51.17	51.19	51.21	51.23	51.25	2, 300
2, 310	51.25	51.27	51.29	51.31	51.33	51.35	51.37	51.39	51.41	51.43	51.45	2, 310
2, 320	51.45	51.47	51.48	51.50	51.52	51.54	51.56	51.58	51.60	51.62	51.64	2, 320
2, 330	51.64	51.66	51.68	51.70	51.72	51.74	51.76	51.78	51.80	51.82	51.84	2, 330
2, 340	51.84	51.86	51.88	51.90	51.92	51.94	51.96	51.98	52.00	52.01	52.03	2, 340
2, 350	52.03	52.05	52.07	52.09	52.11	52.13	52.15	52.17	52.19	52.21	52.23	2, 350
2, 360	52.23	52.25	52.27	52.29	52.31	52.33	52.35	52.37	52.39	52.41	52.42	2, 360
2, 370	52.42	52.44	52.46	52.48	52.50	52.52	52.54	52.56	52.58	52.60	52.62	2, 370
2, 380	52.62	52.64	52.66	52.68	52.70	52.72	52.74	52.76	52.77	52.79	52.81	2, 380
2, 390	52.81	52.83	52.85	52.87	52.89	52.91	52.93	52.95	52.97	52.99	53.01	2, 390
2, 400	53.01	53.03	53.05	53.07	53.08	53.10	53.12	53.14	53.16	53.18	53.20	2, 400
2, 410	53.20	53.22	53.24	53.26	53.28	53.30	53.32	53.34	53.35	53.37	53.39	2, 410
2, 420	53.39	53.41	53.43	53.45	53.47	53.49	53.51	53.53	53.55	53.57	53.59	2, 420
2, 430	53.59	53.60	53.62	53.64	53.66	53.68	53.70	53.72	53.74	53.76	53.78	2, 430
2, 440	53.78	53.80	53.82	53.83	53.85	53.87	53.89	53.91	53.93	53.95	53.97	2, 440
2, 450	53.97	53.99	54.01	54.03	54.04	54.06	54.08	54.10	54.12	54.14	54.16	2, 450
2, 460	54.16	54.18	54.20	54.22	54.24	54.25	54.27	54.29	54.31	54.33	54.35	2, 460
2, 470	54.35	54.37	54.39	54.41	54.43	54.44	54.46	54.48	54.50	54.52	54.54	2, 470
2, 480	54.54	54.56	54.58	54.60	54.62	54.63	54.65	54.67	54.69	54.71	54.73	2, 480
2, 490	54.73	54.75	54.77	54.79	54.81	54.82	54.84	54.86	54.88	54.90	54.92	2, 490
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

**Table 18. Iron-Constantan Thermocouples (Modified 1913)**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts
Degrees F												
-7.00	-267	-273	-279	-285	-292	-298	-305	-313	-320	-----	-----	-7.00
-6.00	-212	-217	-222	-228	-233	-238	-244	-249	-255	-261	-267	-6.00
-5.00	-165	-169	-174	-178	-183	-188	-192	-197	-202	-207	-212	-5.00
-4.00	-121	-125	-130	-134	-138	-142	-147	-151	-156	-160	-165	-4.00
-3.00	-80	-84	-88	-92	-96	-100	-105	-109	-113	-117	-121	-3.00
-2.00	-42	-45	-49	-53	-57	-61	-65	-69	-72	-76	-80	-2.00
-1.00	-4	-8	-12	-15	-19	-23	-26	-30	-34	-38	-42	-1.00
(-)0.00	32	29	25	21	18	14	10	7	3	0	-4	(-)0.00
(+)0.00	32	36	39	43	46	50	53	57	60	64	67	(+)0.00
1.00	67	71	74	78	81	85	88	92	95	99	102	1.00
2.00	102	105	109	112	116	119	123	126	129	133	136	2.00
3.00	136	140	143	146	150	153	156	160	163	166	170	3.00
4.00	170	173	177	180	183	187	190	193	196	200	203	4.00
5.00	203	206	210	213	216	220	223	226	230	233	236	5.00
6.00	236	240	243	246	249	253	256	259	263	266	269	6.00
7.00	269	272	276	279	282	286	289	292	295	299	302	7.00
8.00	302	305	308	312	315	318	321	325	328	331	334	8.00
9.00	334	338	341	344	347	351	354	357	360	364	367	9.00
10.00	367	370	373	376	380	383	386	389	393	396	399	10.00
11.00	399	402	406	409	412	415	419	422	425	428	431	11.00
12.00	431	435	438	441	444	448	451	454	457	461	464	12.00
13.00	464	467	470	474	477	480	483	487	490	493	496	13.00
14.00	496	499	503	506	509	513	516	519	522	526	529	14.00
15.00	529	532	535	539	542	545	548	552	555	558	561	15.00
16.00	561	565	568	571	574	578	581	584	587	591	594	16.00
17.00	594	597	601	604	607	610	614	617	620	623	627	17.00
18.00	627	630	633	636	640	643	646	649	653	656	659	18.00
19.00	659	662	666	669	672	675	679	682	685	688	692	19.00
20.00	692	695	698	701	705	708	711	714	718	721	724	20.00
21.00	724	727	731	734	737	741	744	747	750	754	757	21.00
22.00	757	760	763	767	770	773	777	780	783	786	790	22.00
23.00	790	793	796	799	803	806	809	812	816	819	822	23.00
24.00	822	825	829	832	835	839	842	845	848	852	855	24.00
25.00	855	858	861	865	868	871	874	878	881	884	887	25.00
26.00	887	890	894	897	900	903	907	910	913	916	919	26.00
27.00	919	923	926	929	932	936	939	942	945	948	952	27.00
28.00	952	955	958	961	964	967	971	974	977	980	983	28.00
29.00	983	987	990	993	996	999	1,002	1,006	1,009	1,012	1,015	29.00
30.00	1,015	1,018	1,021	1,024	1,028	1,031	1,034	1,037	1,040	1,043	1,046	30.00
Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts

\*Based on the International Temperature Scale of 1948.

**Table 18. Iron-Constantan Thermocouples (Modified 1913)—Continued**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts
Degrees F												
30.00	1,015	1,018	1,021	1,024	1,028	1,031	1,034	1,037	1,040	1,043	1,046	30.00
31.00	1,046	1,050	1,053	1,056	1,059	1,062	1,065	1,068	1,071	1,074	1,078	31.00
32.00	1,078	1,081	1,084	1,087	1,090	1,093	1,096	1,099	1,102	1,105	1,108	32.00
33.00	1,108	1,112	1,115	1,118	1,121	1,124	1,127	1,130	1,133	1,136	1,139	33.00
34.00	1,139	1,142	1,145	1,148	1,151	1,154	1,157	1,160	1,164	1,167	1,170	34.00
35.00	1,170	1,173	1,176	1,179	1,182	1,185	1,188	1,191	1,194	1,197	1,200	35.00
36.00	1,200	1,203	1,206	1,109	1,212	1,215	1,217	1,220	1,223	1,226	1,229	36.00
37.00	1,229	1,232	1,235	1,238	1,241	1,244	1,247	1,250	1,253	1,256	1,259	37.00
38.00	1,259	1,261	1,264	1,267	1,270	1,273	1,276	1,279	1,282	1,285	1,288	38.00
39.00	1,288	1,290	1,293	1,296	1,299	1,302	1,305	1,308	1,311	1,313	1,316	39.00
40.00	1,316	1,319	1,322	1,325	1,328	1,331	1,333	1,336	1,339	1,342	1,345	40.00
41.00	1,345	1,348	1,350	1,353	1,356	1,359	1,362	1,365	1,367	1,370	1,373	41.00
42.00	1,373	1,376	1,379	1,381	1,384	1,387	1,390	1,393	1,395	1,398	1,401	42.00
Millivolts	.00	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00	Millivolts

\*Based on the International Temperature Scale of 1948.

# Table 19. Iron-Constantan Thermocouples (Modified 1913)

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
Millivolts												
-310	-7.66	-7.68	-7.69	-7.70	-7.71	-7.73	-7.74	-7.75	-7.76	-7.78	-7.79	-310
-300	-7.52	-7.54	-7.55	-7.57	-7.58	-7.59	-7.61	-7.62	-7.64	-7.65	-7.66	-300
-290	-7.38	-7.39	-7.40	-7.42	-7.44	-7.45	-7.46	-7.48	-7.49	-7.51	-7.52	-290
-280	-7.22	-7.24	-7.25	-7.27	-7.28	-7.30	-7.31	-7.33	-7.34	-7.36	-7.38	-280
-270	-7.06	-7.07	-7.09	-7.11	-7.12	-7.14	-7.15	-7.17	-7.19	-7.20	-7.22	-270
-260	-6.89	-6.90	-6.92	-6.94	-6.96	-6.97	-6.99	-7.01	-7.02	-7.04	-7.06	-260
-250	-6.71	-6.73	-6.75	-6.77	-6.78	-6.80	-6.82	-6.84	-6.85	-6.87	-6.89	-250
-240	-6.53	-6.55	-6.57	-6.59	-6.61	-6.62	-6.64	-6.66	-6.68	-6.70	-6.71	-240
-230	-6.35	-6.37	-6.38	-6.40	-6.42	-6.44	-6.46	-6.48	-6.50	-6.52	-6.53	-230
-220	-6.16	-6.18	-6.19	-6.21	-6.23	-6.25	-6.27	-6.29	-6.31	-6.33	-6.35	-220
-210	-5.96	-5.98	-6.00	-6.02	-6.04	-6.06	-6.08	-6.10	-6.12	-6.14	-6.16	-210
-200	-5.76	-5.78	-5.80	-5.82	-5.84	-5.86	-5.88	-5.90	-5.92	-5.94	-5.96	-200
-190	-5.55	-5.57	-5.59	-5.61	-5.63	-5.65	-5.67	-5.70	-5.72	-5.74	-5.76	-190
-180	-5.34	-5.36	-5.38	-5.40	-5.42	-5.44	-5.46	-5.49	-5.51	-5.53	-5.55	-180
-170	-5.12	-5.14	-5.16	-5.19	-5.21	-5.23	-5.25	-5.27	-5.30	-5.32	-5.34	-170
-160	-4.90	-4.92	-4.94	-4.97	-4.99	-5.01	-5.03	-5.06	-5.08	-5.10	-5.12	-160
-150	-4.68	-4.70	-4.72	-4.74	-4.76	-4.79	-4.81	-4.83	-4.86	-4.88	-4.90	-150
-140	-4.44	-4.47	-4.49	-4.51	-4.54	-4.56	-4.58	-4.61	-4.63	-4.65	-4.68	-140
-130	-4.21	-4.23	-4.26	-4.28	-4.30	-4.33	-4.35	-4.38	-4.40	-4.42	-4.44	-130
-120	-3.97	-4.00	-4.02	-4.04	-4.07	-4.09	-4.12	-4.14	-4.16	-4.19	-4.21	-120
-110	-3.73	-3.76	-3.78	-3.81	-3.83	-3.85	-3.88	-3.90	-3.93	-3.95	-3.97	-110
-100	-3.49	-3.51	-3.54	-3.56	-3.59	-3.61	-3.64	-3.66	-3.68	-3.71	-3.73	-100
-90	-3.24	-3.27	-3.29	-3.32	-3.34	-3.36	-3.39	-3.41	-3.44	-3.46	-3.49	-90
-80	-2.99	-3.02	-3.04	-3.07	-3.09	-3.12	-3.14	-3.17	-3.19	-3.22	-3.24	-80
-70	-2.74	-2.76	-2.79	-2.81	-2.84	-2.86	-2.89	-2.92	-2.94	-2.97	-2.99	-70
-60	-2.48	-2.51	-2.53	-2.56	-2.58	-2.61	-2.64	-2.66	-2.69	-2.71	-2.74	-60
-50	-2.22	-2.25	-2.27	-2.30	-2.33	-2.35	-2.38	-2.40	-2.43	-2.46	-2.48	-50
-40	-1.96	-1.99	-2.01	-2.04	-2.06	-2.09	-2.12	-2.14	-2.17	-2.20	-2.22	-40
-30	-1.70	-1.72	-1.75	-1.78	-1.80	-1.83	-1.86	-1.88	-1.91	-1.94	-1.96	-30
-20	-1.43	-1.46	-1.48	-1.51	-1.54	-1.56	-1.59	-1.62	-1.64	-1.67	-1.70	-20
-10	-1.16	-1.19	-1.21	-1.24	-1.27	-1.29	-1.32	-1.35	-1.38	-1.40	-1.43	-10
(-)0	-0.89	-0.91	-0.94	-0.97	-1.00	-1.02	-1.05	-1.08	-1.10	-1.13	-1.16	(-)0
(+)0	-0.89	-0.86	-0.83	-0.80	-0.78	-0.75	-0.72	-0.70	-0.67	-0.64	-0.61	(+)0
10	-0.61	-0.58	-0.56	-0.53	-0.50	-0.48	-0.45	-0.42	-0.39	-0.36	-0.34	10
20	-0.34	-0.31	-0.28	-0.25	-0.22	-0.20	-0.17	-0.14	-0.11	-0.09	-0.06	20
30	-0.06	-0.03	0.00	0.03	0.05	0.08	0.11	0.14	0.17	0.19	0.22	30
40	0.22	0.25	0.28	0.31	0.34	0.36	0.39	0.42	0.45	0.48	0.50	40
50	0.50	0.53	0.56	0.59	0.62	0.65	0.67	0.70	0.73	0.76	0.79	50
60	0.79	0.82	0.84	0.87	0.90	0.93	0.96	0.99	1.02	1.04	1.07	60
70	1.07	1.10	1.13	1.16	1.19	1.22	1.25	1.28	1.30	1.33	1.36	70
80	1.36	1.39	1.42	1.45	1.48	1.51	1.54	1.56	1.59	1.62	1.65	80
90	1.65	1.68	1.71	1.74	1.77	1.80	1.83	1.85	1.88	1.91	1.94	90
100	1.94	1.97	2.00	2.03	2.06	2.09	2.12	2.14	2.17	2.20	2.23	100
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.



**Table 19. Iron-Constantan Thermocouples (Modified 1913)—Continued**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
<b>Millivolts</b>												
<b>100</b>	1.94	1.97	2.00	2.03	2.06	2.09	2.12	2.14	2.17	2.20	2.23	<b>100</b>
<b>110</b>	2.23	2.26	2.29	2.32	2.35	2.38	2.41	2.44	2.47	2.50	2.52	<b>110</b>
<b>120</b>	2.52	2.55	2.58	2.61	2.64	2.67	2.70	2.73	2.76	2.79	2.82	<b>120</b>
<b>130</b>	2.82	2.85	2.88	2.91	2.94	2.97	3.00	3.03	3.06	3.08	3.11	<b>130</b>
<b>140</b>	3.11	3.14	3.17	3.20	3.23	3.26	3.29	3.32	3.35	3.38	3.41	<b>140</b>
<b>150</b>	3.41	3.44	3.47	3.50	3.53	3.56	3.59	3.62	3.65	3.68	3.71	<b>150</b>
<b>160</b>	3.71	3.74	3.77	3.80	3.83	3.86	3.89	3.92	3.95	3.98	4.01	<b>160</b>
<b>170</b>	4.01	4.04	4.07	4.10	4.13	4.16	4.19	4.22	4.25	4.28	4.31	<b>170</b>
<b>180</b>	4.31	4.34	4.37	4.40	4.43	4.46	4.49	4.52	4.55	4.58	4.61	<b>180</b>
<b>190</b>	4.61	4.64	4.67	4.70	4.73	4.76	4.79	4.82	4.85	4.88	4.91	<b>190</b>
<b>200</b>	4.91	4.94	4.97	5.00	5.03	5.06	5.09	5.12	5.15	5.18	5.21	<b>200</b>
<b>210</b>	5.21	5.24	5.27	5.30	5.33	5.36	5.39	5.42	5.45	5.48	5.51	<b>210</b>
<b>220</b>	5.51	5.54	5.57	5.60	5.63	5.66	5.69	5.72	5.75	5.78	5.81	<b>220</b>
<b>230</b>	5.81	5.84	5.87	5.90	5.93	5.96	5.99	6.02	6.05	6.08	6.11	<b>230</b>
<b>240</b>	6.11	6.14	6.17	6.20	6.24	6.27	6.30	6.33	6.36	6.39	6.42	<b>240</b>
<b>250</b>	6.42	6.45	6.48	6.51	6.54	6.57	6.60	6.63	6.66	6.69	6.72	<b>250</b>
<b>260</b>	6.72	6.75	6.78	6.81	6.84	6.87	6.90	6.93	6.96	7.00	7.03	<b>260</b>
<b>270</b>	7.03	7.06	7.09	7.12	7.15	7.18	7.21	7.24	7.27	7.30	7.33	<b>270</b>
<b>280</b>	7.33	7.36	7.39	7.42	7.45	7.48	7.51	7.54	7.58	7.61	7.64	<b>280</b>
<b>290</b>	7.64	7.67	7.70	7.73	7.76	7.79	7.82	7.85	7.88	7.91	7.94	<b>290</b>
<b>300</b>	7.94	7.97	8.00	8.04	8.07	8.10	8.13	8.16	8.19	8.22	8.25	<b>300</b>
<b>310</b>	8.25	8.28	8.31	8.34	8.37	8.40	8.44	8.47	8.50	8.53	8.56	<b>310</b>
<b>320</b>	8.56	8.59	8.62	8.65	8.68	8.71	8.74	8.77	8.80	8.84	8.87	<b>320</b>
<b>330</b>	8.87	8.90	8.93	8.96	8.99	9.02	9.05	9.08	9.11	9.14	9.17	<b>330</b>
<b>340</b>	9.17	9.20	9.24	9.27	9.30	9.33	9.36	9.39	9.42	9.45	9.48	<b>340</b>
<b>350</b>	9.48	9.51	9.54	9.58	9.61	9.64	9.67	9.70	9.73	9.76	9.79	<b>350</b>
<b>360</b>	9.79	9.82	9.85	9.88	9.92	9.95	9.98	10.01	10.04	10.07	10.10	<b>360</b>
<b>370</b>	10.10	10.13	10.16	10.19	10.22	10.25	10.28	10.32	10.35	10.38	10.41	<b>370</b>
<b>380</b>	10.41	10.44	10.47	10.50	10.53	10.56	10.60	10.63	10.66	10.69	10.72	<b>380</b>
<b>390</b>	10.72	10.75	10.78	10.81	10.84	10.87	10.90	10.94	10.97	11.00	11.03	<b>390</b>
<b>400</b>	11.03	11.06	11.09	11.12	11.15	11.18	11.21	11.24	11.28	11.31	11.34	<b>400</b>
<b>410</b>	11.34	11.37	11.40	11.43	11.46	11.49	11.52	11.55	11.58	11.62	11.65	<b>410</b>
<b>420</b>	11.65	11.68	11.71	11.74	11.77	11.80	11.83	11.86	11.89	11.92	11.96	<b>420</b>
<b>430</b>	11.96	11.99	12.02	12.05	12.08	12.11	12.14	12.17	12.20	12.23	12.26	<b>430</b>
<b>440</b>	12.26	12.30	12.33	12.36	12.39	12.42	12.45	12.48	12.51	12.54	12.57	<b>440</b>
<b>450</b>	12.57	12.60	12.64	12.67	12.70	12.73	12.76	12.79	12.82	12.85	12.88	<b>450</b>
<b>460</b>	12.88	12.91	12.94	12.98	13.01	13.04	13.07	13.10	13.13	13.16	13.19	<b>460</b>
<b>470</b>	13.19	13.22	13.25	13.28	13.31	13.34	13.38	13.41	13.44	13.47	13.50	<b>470</b>
<b>480</b>	13.50	13.53	13.56	13.59	13.62	13.65	13.68	13.72	13.75	13.78	13.81	<b>480</b>
<b>490</b>	13.81	13.84	13.87	13.90	13.93	13.96	13.99	14.02	14.05	14.08	14.12	<b>490</b>
<b>500</b>	14.12	14.15	14.18	14.21	14.24	14.27	14.30	14.33	14.36	14.39	14.42	<b>500</b>
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.

# Table 19. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
Millivolts												
500	14.12	14.15	14.18	14.21	14.24	14.27	14.30	14.33	14.36	14.39	14.42	500
510	14.42	14.45	14.48	14.52	14.55	14.58	14.61	14.64	14.67	14.70	14.73	510
520	14.73	14.76	14.79	14.82	14.85	14.88	14.91	14.94	14.98	15.01	15.04	520
530	15.04	15.07	15.10	15.13	15.16	15.19	15.22	15.25	15.28	15.31	15.34	530
540	15.34	15.37	15.40	15.44	15.47	15.50	15.53	15.56	15.59	15.62	15.65	540
550	15.65	15.68	15.71	15.74	15.77	15.80	15.84	15.87	15.90	15.93	15.96	550
560	15.96	15.99	16.02	16.05	16.08	16.11	16.14	16.17	16.20	16.23	16.26	560
570	16.26	16.30	16.33	16.36	16.39	16.42	16.45	16.48	16.51	16.54	16.57	570
580	16.57	16.60	16.63	16.66	16.69	16.72	16.75	16.78	16.82	16.85	16.88	580
590	16.88	16.91	16.94	16.97	17.00	17.03	17.06	17.09	17.12	17.15	17.18	590
600	17.18	17.21	17.24	17.28	17.31	17.34	17.37	17.40	17.43	17.46	17.49	600
610	17.49	17.52	17.55	17.58	17.61	17.64	17.68	17.71	17.74	17.77	17.80	610
620	17.80	17.83	17.86	17.89	17.92	17.95	17.98	18.01	18.04	18.08	18.11	620
630	18.11	18.14	18.17	18.20	18.23	18.26	18.29	18.32	18.35	18.38	18.41	630
640	18.41	18.44	18.47	18.50	18.54	18.57	18.60	18.63	18.66	18.69	18.72	640
650	18.72	18.75	18.78	18.81	18.84	18.87	18.90	18.94	18.97	19.00	19.03	650
660	19.03	19.06	19.09	19.12	19.15	19.18	19.21	19.24	19.27	19.30	19.34	660
670	19.34	19.37	19.40	19.43	19.46	19.49	19.52	19.55	19.58	19.61	19.64	670
680	19.64	19.67	19.70	19.74	19.77	19.80	19.83	19.86	19.89	19.92	19.95	680
690	19.95	19.98	20.01	20.04	20.07	20.10	20.13	20.16	20.20	20.23	20.26	690
700	20.26	20.29	20.32	20.35	20.38	20.41	20.44	20.47	20.50	20.53	20.56	700
710	20.56	20.59	20.62	20.66	20.69	20.72	20.75	20.78	20.81	20.84	20.87	710
720	20.87	20.90	20.93	20.96	20.99	21.02	21.05	21.08	21.11	21.14	21.18	720
730	21.18	21.21	21.24	21.27	21.30	21.33	21.36	21.39	21.42	21.45	21.48	730
740	21.48	21.51	21.54	21.57	21.60	21.64	21.67	21.70	21.73	21.76	21.79	740
750	21.79	21.82	21.85	21.88	21.91	21.94	21.97	22.00	22.03	22.06	22.10	750
760	22.10	22.13	22.16	22.19	22.22	22.25	22.28	22.31	22.34	22.37	22.40	760
770	22.40	22.43	22.46	22.49	22.52	22.55	22.58	22.62	22.65	22.68	22.71	770
780	22.71	22.74	22.77	22.80	22.83	22.86	22.89	22.92	22.95	22.98	23.01	780
790	23.01	23.04	23.08	23.11	23.14	23.17	23.20	23.23	23.26	23.29	23.32	790
800	23.32	23.35	23.38	23.41	23.44	23.47	23.50	23.53	23.56	23.60	23.63	800
810	23.63	23.66	23.69	23.72	23.75	23.78	23.81	23.84	23.87	23.90	23.93	810
820	23.93	23.96	23.99	24.02	24.06	24.09	24.12	24.15	24.18	24.21	24.24	820
830	24.24	24.27	24.30	24.33	24.36	24.39	24.42	24.45	24.48	24.52	24.55	830
840	24.55	24.58	24.61	24.64	24.67	24.70	24.73	24.76	24.79	24.82	24.85	840
850	24.85	24.88	24.91	24.94	24.98	25.01	25.04	25.07	25.10	25.13	25.16	850
860	25.16	25.19	25.22	25.25	25.28	25.32	25.35	25.38	25.41	25.44	25.47	860
870	25.47	25.50	25.53	25.56	25.59	25.62	25.65	25.68	25.72	25.75	25.78	870
880	25.78	25.81	25.84	25.87	25.90	25.93	25.96	25.99	26.02	26.06	26.09	880
890	26.09	26.12	26.15	26.18	26.21	26.24	26.27	26.30	26.33	26.36	26.40	890
900	26.40	26.43	26.46	26.49	26.52	26.55	26.58	26.61	26.64	26.67	26.70	900
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.

**Table 19. Iron-Constantan Thermocouples (Modified 1913)—Continued**  
 (Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
	Millivolts											
900	26.40	26.43	26.46	26.49	26.52	26.55	26.58	26.61	26.64	26.67	26.70	900
910	26.70	26.74	26.77	26.80	26.83	26.86	26.89	26.92	26.95	26.98	27.02	910
920	27.02	27.05	27.08	27.11	27.14	27.17	27.20	27.23	27.26	27.30	27.33	920
930	27.33	27.36	27.39	27.42	27.45	27.48	27.51	27.54	27.58	27.61	27.64	930
940	27.64	27.67	27.70	27.73	27.76	27.80	27.83	27.86	27.89	27.92	27.95	940
950	27.95	27.98	28.02	28.05	28.08	28.11	28.14	28.17	28.20	28.23	28.26	950
960	28.26	28.30	28.33	28.36	28.39	28.42	28.45	28.48	28.52	28.55	28.58	960
970	28.58	28.61	28.64	28.67	28.70	28.74	28.77	28.80	28.83	28.86	28.89	970
980	28.89	28.92	28.96	28.99	29.02	29.05	29.08	29.11	29.14	29.18	29.21	980
990	29.21	29.24	29.27	29.30	29.33	29.37	29.40	29.43	29.46	29.49	29.52	990
1,000	29.52	29.56	29.59	29.62	29.65	29.68	29.71	29.75	29.78	29.81	29.84	1,000
1,010	29.84	29.87	29.90	29.94	29.97	30.00	30.03	30.06	30.10	30.13	30.16	1,010
1,020	30.16	30.19	30.22	30.25	30.28	30.32	30.35	30.38	30.41	30.44	30.48	1,020
1,030	30.48	30.51	30.54	30.57	30.60	30.64	30.67	30.70	30.73	30.76	30.80	1,030
1,040	30.80	30.83	30.86	30.89	30.92	30.96	30.99	31.02	31.05	31.08	31.12	1,040
1,050	31.12	31.15	31.18	31.21	31.24	31.28	31.31	31.34	31.37	31.40	31.44	1,050
1,060	31.44	31.47	31.50	31.53	31.56	31.60	31.63	31.66	31.69	31.72	31.76	1,060
1,070	31.76	31.79	31.82	31.85	31.88	31.92	31.95	31.98	32.01	32.05	32.08	1,070
1,080	32.08	32.11	32.14	32.18	32.21	32.24	32.27	32.30	32.34	32.37	32.40	1,080
1,090	32.40	32.43	32.47	32.50	32.53	32.56	32.60	32.63	32.66	32.69	32.72	1,090
1,100	32.72	32.76	32.79	32.82	32.86	32.89	32.92	32.95	32.98	33.02	33.05	1,100
1,110	33.05	33.08	33.11	33.15	33.18	33.21	33.24	33.28	33.31	33.34	33.37	1,110
1,120	33.37	33.41	33.44	33.47	33.50	33.54	33.57	33.60	33.64	33.67	33.70	1,120
1,130	33.70	33.73	33.76	33.80	33.83	33.86	33.90	33.93	33.96	33.99	34.03	1,130
1,140	34.03	34.06	34.09	34.12	34.16	34.19	34.22	34.26	34.29	34.32	34.36	1,140
1,150	34.36	34.39	34.42	34.45	34.49	34.52	34.55	34.58	34.62	34.65	34.68	1,150
1,160	34.68	34.72	34.75	34.78	34.82	34.85	34.88	34.92	34.95	34.98	35.01	1,160
1,170	35.01	35.05	35.08	35.11	35.15	35.18	35.21	35.25	35.28	35.31	35.35	1,170
1,180	35.35	35.38	35.41	35.45	35.48	35.51	35.54	35.58	35.61	35.64	35.68	1,180
1,190	35.68	35.71	35.74	35.78	35.81	35.84	35.88	35.91	35.94	35.98	36.01	1,190
1,200	36.01	36.05	36.08	36.11	36.15	36.18	36.21	36.25	36.28	36.31	36.35	1,200
1,210	36.35	36.38	36.42	36.45	36.48	36.52	36.55	36.58	36.62	36.65	36.69	1,210
1,220	36.69	36.72	36.75	36.79	36.82	36.86	36.89	36.92	36.96	36.99	37.02	1,220
1,230	37.02	37.06	37.09	37.13	37.16	37.20	37.23	37.26	37.30	37.33	37.36	1,230
1,240	37.36	37.40	37.43	37.47	37.50	37.54	37.57	37.60	37.64	37.67	37.71	1,240
1,250	37.71	37.74	37.78	37.81	37.84	37.88	37.91	37.95	37.98	38.02	38.05	1,250
1,260	38.05	38.08	38.12	38.15	38.19	38.22	38.26	38.29	38.32	38.36	38.39	1,260
1,270	38.39	38.43	38.46	38.50	38.53	38.57	38.60	38.64	38.67	38.70	38.74	1,270
1,280	38.74	38.77	38.81	38.84	38.88	38.91	38.95	38.98	39.02	39.05	39.08	1,280
1,290	39.08	39.12	39.15	39.19	39.22	39.26	39.29	39.33	39.36	39.40	39.43	1,290
1,300	39.43	39.47	39.50	39.54	39.57	39.61	39.64	39.68	39.71	39.75	39.78	1,300
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.

# Table 19. Iron-Constantan Thermocouples (Modified 1913)—Continued

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
	Millivolts											
1,300	39.43	39.47	39.50	39.54	39.57	39.61	39.64	39.68	39.71	39.75	39.78	1,300
1,310	39.78	39.82	39.85	39.89	39.92	39.96	39.99	40.03	40.06	40.10	40.13	1,310
1,320	40.13	40.17	40.20	40.24	40.27	40.31	40.34	40.38	40.41	40.45	40.48	1,320
1,330	40.48	40.52	40.55	40.59	40.62	40.66	40.69	40.73	40.76	40.80	40.83	1,330
1,340	40.83	40.87	40.90	40.94	40.98	41.01	41.05	41.08	41.12	41.15	41.19	1,340
1,350	41.19	41.22	41.26	41.29	41.33	41.36	41.40	41.43	41.47	41.50	41.54	1,350
1,360	41.54	41.58	41.61	41.65	41.68	41.72	41.75	41.79	41.82	41.86	41.90	1,360
1,370	41.90	41.93	41.97	42.00	42.04	42.07	42.11	42.14	42.18	42.22	42.25	1,370
1,380	42.25	42.29	42.32	42.36	42.39	42.43	42.46	42.50	42.53	42.57	42.61	1,380
1,390	42.61	42.64	42.68	42.71	42.75	42.78	42.82	42.85	42.89	42.92	42.96	1,390
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.

# Table 20. Copper-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

Millivolts	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	Millivolts
Degrees F												
-5.00	-272.4	-281.8	-291.5	-301.7	-312.3	-322.7	-337.8	-346.0	-354.5	-363.3	-372.4	-5.00
-4.00	-192.0	-199.2	-206.6	-214.1	-221.8	-229.7	-237.8	-246.0	-254.5	-263.3	-272.4	-4.00
-3.00	-126.2	-132.4	-138.6	-144.9	-151.3	-157.8	-164.4	-171.1	-178.0	-184.9	-192.0	-3.00
-2.00	-68.6	-74.1	-79.6	-85.2	-90.9	-96.6	-102.4	-108.2	-114.2	-120.2	-126.2	-2.00
-1.00	-16.4	-21.4	-26.5	-31.6	-36.7	-41.9	-47.2	-52.4	-57.8	-63.2	-68.6	-1.00
(-) 0.00	32.0	27.3	22.6	17.8	13.0	8.2	3.4	-1.5	-6.4	-11.4	-16.4	(-) 0.00
(+) 0.00	32.0	36.7	41.3	45.9	50.5	55.0	59.6	64.1	68.6	73.0	77.5	(+) 0.00
1.00	77.5	81.9	86.2	90.6	95.0	99.3	103.6	107.8	112.1	116.3	120.5	1.00
2.00	120.5	124.7	128.9	133.1	137.3	141.4	145.4	149.5	153.6	157.7	161.7	2.00
3.00	161.7	165.7	169.7	173.7	177.7	181.7	185.6	189.5	193.5	197.4	201.3	3.00
4.00	201.3	205.2	209.0	212.9	216.7	220.5	224.4	228.2	232.0	235.7	239.5	4.00
5.00	239.5	243.2	247.0	250.7	254.4	258.1	261.9	265.6	269.2	272.9	276.6	5.00
6.00	276.6	280.2	283.9	287.5	291.1	294.7	298.3	301.9	305.5	309.1	312.6	6.00
7.00	312.6	316.2	319.7	323.3	326.8	330.3	333.8	337.3	340.8	344.3	347.8	7.00
8.00	347.8	351.3	354.8	358.2	361.7	365.1	368.6	372.0	375.4	378.8	382.2	8.00
9.00	382.2	385.6	389.0	392.4	395.8	399.2	402.5	405.9	409.2	412.6	415.9	9.00
10.00	415.9	419.2	422.6	425.9	429.2	432.5	435.9	439.2	442.4	445.7	449.0	10.00
11.00	449.0	452.3	455.5	458.8	462.1	465.3	468.6	471.9	475.1	478.3	481.5	11.00
12.00	481.5	484.7	488.0	491.2	494.4	497.6	500.8	504.0	507.2	510.4	513.5	12.00
13.00	513.5	516.7	519.9	523.1	526.2	529.4	532.5	535.7	538.8	542.0	545.1	13.00
14.00	545.1	548.2	551.3	554.5	557.6	560.7	563.8	566.9	570.0	573.1	576.2	14.00
15.00	576.2	579.3	582.4	585.5	588.6	591.6	594.7	597.8	600.8	603.9	606.9	15.00
16.00	606.9	610.0	613.0	616.1	619.1	622.2	625.2	628.2	631.3	634.3	637.3	16.00
17.00	637.3	640.3	643.3	646.4	649.4	652.4	655.4	658.4	661.4	664.4	667.4	17.00
18.00	667.4	670.3	673.3	676.3	679.3	682.2	685.2	688.2	691.1	694.1	697.1	18.00
19.00	697.1	700.0	703.0	705.9	708.9	711.8	714.8	717.7	720.6	723.6	726.5	19.00
20.00	726.5	729.4	732.3	735.3	738.2	741.1	744.0	746.9	749.9	-----	-----	20.00
Millivolts	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00	Millivolts

\*Based on the International Temperature Scale of 1948.

# Table 21. Copper-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
Millivolts												
-310	-5.379	-5.388	-5.397	-5.406	-----	-----	-----	-----	-----	-----	-----	-310
-300	-5.284	-5.294	-5.303	-5.313	-5.322	-5.332	-5.341	-5.351	-5.360	-5.370	-5.379	-300
-290	-5.185	-5.195	-5.205	-5.215	-5.225	-5.235	-5.245	-5.254	-5.264	-5.274	-5.284	-290
-280	-5.081	-5.092	-5.102	-5.113	-5.124	-5.134	-5.144	-5.154	-5.165	-5.175	-5.185	-280
-270	-4.974	-4.985	-4.996	-5.007	-5.018	-5.029	-5.039	-5.050	-5.060	-5.071	-5.081	-270
-260	-4.863	-4.874	-4.885	-4.897	-4.908	-4.919	-4.930	-4.941	-4.952	-4.963	-4.974	-260
-250	-4.747	-4.759	-4.770	-4.782	-4.794	-4.805	-4.817	-4.829	-4.840	-4.851	-4.863	-250
-240	-4.627	-4.640	-4.652	-4.664	-4.676	-4.688	-4.700	-4.712	-4.724	-4.735	-4.747	-240
-230	-4.504	-4.517	-4.529	-4.542	-4.554	-4.566	-4.579	-4.591	-4.603	-4.615	-4.627	-230
-220	-4.377	-4.390	-4.403	-4.415	-4.428	-4.441	-4.454	-4.466	-4.479	-4.492	-4.504	-220
-210	-4.246	-4.259	-4.272	-4.286	-4.299	-4.312	-4.325	-4.338	-4.351	-4.364	-4.377	-210
-200	-4.111	-4.125	-4.138	-4.151	-4.165	-4.179	-4.192	-4.206	-4.219	-4.232	-4.246	-200
-190	-3.972	-3.986	-4.000	-4.014	-4.028	-4.042	-4.056	-4.069	-4.083	-4.097	-4.111	-190
-180	-3.829	-3.844	-3.858	-3.873	-3.887	-3.901	-3.915	-3.929	-3.944	-3.958	-3.972	-180
-170	-3.684	-3.698	-3.713	-3.727	-3.742	-3.757	-3.771	-3.786	-3.800	-3.815	-3.829	-170
-160	-3.533	-3.548	-3.564	-3.579	-3.594	-3.609	-3.624	-3.639	-3.654	-3.669	-3.684	-160
-150	-3.380	-3.396	-3.411	-3.426	-3.441	-3.457	-3.472	-3.488	-3.503	-3.518	-3.533	-150
-140	-3.223	-3.238	-3.254	-3.270	-3.286	-3.301	-3.317	-3.333	-3.349	-3.365	-3.380	-140
-130	-3.062	-3.078	-3.094	-3.110	-3.127	-3.143	-3.159	-3.175	-3.191	-3.207	-3.223	-130
-120	-2.897	-2.914	-2.931	-2.947	-2.964	-2.980	-2.997	-3.013	-3.030	-3.046	-3.062	-120
-110	-2.730	-2.747	-2.764	-2.781	-2.797	-2.814	-2.831	-2.847	-2.864	-2.881	-2.897	-110
-100	-2.559	-2.577	-2.594	-2.611	-2.628	-2.645	-2.662	-2.679	-2.696	-2.713	-2.730	-100
-90	-2.385	-2.402	-2.420	-2.437	-2.455	-2.472	-2.490	-2.507	-2.525	-2.542	-2.559	-90
-80	-2.207	-2.225	-2.243	-2.260	-2.278	-2.296	-2.314	-2.332	-2.349	-2.367	-2.385	-80
-70	-2.026	-2.044	-2.063	-2.081	-2.099	-2.117	-2.135	-2.153	-2.171	-2.189	-2.207	-70
-60	-1.842	-1.860	-1.879	-1.897	-1.916	-1.934	-1.953	-1.971	-1.989	-2.008	-2.026	-60
-50	-1.654	-1.673	-1.692	-1.711	-1.729	-1.748	-1.767	-1.786	-1.804	-1.823	-1.842	-50
-40	-1.463	-1.482	-1.502	-1.521	-1.540	-1.559	-1.578	-1.597	-1.616	-1.635	-1.654	-40
-30	-1.270	-1.289	-1.308	-1.328	-1.347	-1.367	-1.386	-1.406	-1.425	-1.444	-1.463	-30
-20	-1.072	-1.092	-1.112	-1.132	-1.152	-1.171	-1.191	-1.210	-1.230	-1.250	-1.270	-20
-10	-0.872	-0.893	-0.913	-0.933	-0.953	-0.973	-0.993	-1.013	-1.033	-1.053	-1.072	-10
(-)0	-0.670	-0.690	-0.710	-0.730	-0.751	-0.771	-0.792	-0.812	-0.832	-0.852	-0.872	(-)0
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

# **Table 21. Copper Constantan Thermocouples—Con.**

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

° F	0	1	2	3	4	5	6	7	8	9	10	° F
(+)0	Millivolts											(+)0
	-0.670	-0.649	-0.629	-0.608	-0.588	-0.567	-0.546	-0.526	-0.505	-0.484	-0.463	
	-0.463	-0.442	-0.421	-0.401	-0.380	-0.359	-0.339	-0.318	-0.297	-0.275	-0.254	
	-0.254	-0.233	-0.212	-0.191	-0.170	-0.149	-0.128	-0.107	-0.085	-0.064	-0.042	
	-0.042	-0.021	0.000	0.021	0.042	0.064	0.086	0.107	0.129	0.150	0.171	
	0.171	0.193	0.215	0.236	0.258	0.280	0.302	0.324	0.346	0.367	0.389	
	0.389	0.411	0.433	0.455	0.477	0.499	0.521	0.543	0.565	0.587	0.609	
	0.609	0.631	0.654	0.676	0.698	0.720	0.743	0.765	0.787	0.809	0.832	
	0.832	0.854	0.877	0.899	0.922	0.944	0.967	0.990	1.012	1.035	1.057	
	1.057	1.080	1.103	1.126	1.148	1.171	1.194	1.217	1.240	1.263	1.286	
	1.286	1.309	1.332	1.355	1.378	1.401	1.424	1.448	1.471	1.494	1.517	
100	1.517	1.540	1.563	1.587	1.610	1.633	1.657	1.680	1.704	1.727	1.751	100
110	1.751	1.774	1.798	1.821	1.845	1.869	1.893	1.916	1.940	1.963	1.987	110
120	1.987	2.011	2.035	2.059	2.083	2.107	2.131	2.154	2.178	2.202	2.226	120
130	2.226	2.250	2.274	2.298	2.322	2.346	2.370	2.394	2.418	2.443	2.467	130
140	2.467	2.491	2.516	2.540	2.565	2.589	2.614	2.638	2.663	2.687	2.711	140
150	2.711	2.736	2.760	2.785	2.810	2.835	2.859	2.884	2.908	2.933	2.958	150
160	2.958	2.982	3.007	3.032	3.057	3.082	3.107	3.132	3.157	3.182	3.207	160
170	3.207	3.232	3.257	3.282	3.307	3.332	3.357	3.382	3.407	3.433	3.458	170
180	3.458	3.483	3.508	3.534	3.559	3.584	3.610	3.635	3.661	3.686	3.712	180
190	3.712	3.737	3.762	3.787	3.813	3.839	3.864	3.890	3.915	3.941	3.967	190
200	3.967	3.993	4.018	4.044	4.070	4.096	4.122	4.148	4.174	4.199	4.225	200
210	4.225	4.251	4.277	4.303	4.329	4.355	4.381	4.408	4.434	4.460	4.486	210
220	4.486	4.512	4.538	4.564	4.590	4.617	4.643	4.670	4.696	4.722	4.749	220
230	4.749	4.775	4.801	4.827	4.854	4.880	4.907	4.934	4.960	4.987	5.014	230
240	5.014	5.040	5.067	5.094	5.120	5.147	5.174	5.200	5.227	5.254	5.280	240
250	5.280	5.307	5.334	5.361	5.388	5.415	5.442	5.469	5.496	5.523	5.550	250
260	5.550	5.577	5.604	5.631	5.658	5.685	5.712	5.739	5.766	5.794	5.821	260
270	5.821	5.848	5.875	5.903	5.930	5.957	5.985	6.012	6.040	6.067	6.094	270
280	6.094	6.122	6.149	6.177	6.204	6.232	6.259	6.287	6.314	6.342	6.370	280
290	6.370	6.397	6.425	6.453	6.481	6.508	6.536	6.564	6.592	6.620	6.647	290
300	6.647	6.675	6.703	6.731	6.759	6.786	6.814	6.842	6.870	6.898	6.926	300
310	6.926	6.954	6.982	7.010	7.038	7.066	7.095	7.123	7.151	7.180	7.208	310
320	7.208	7.236	7.264	7.292	7.321	7.349	7.377	7.405	7.434	7.462	7.491	320
330	7.491	7.519	7.548	7.576	7.605	7.633	7.661	7.690	7.719	7.747	7.776	330
340	7.776	7.805	7.834	7.862	7.891	7.920	7.949	7.978	8.006	8.035	8.064	340
350	8.064	8.092	8.120	8.149	8.178	8.207	8.236	8.265	8.294	8.323	8.352	350
360	8.352	8.381	8.410	8.439	8.468	8.497	8.526	8.555	8.584	8.613	8.642	360
370	8.642	8.672	8.701	8.730	8.759	8.788	8.818	8.847	8.876	8.905	8.935	370
380	8.935	8.964	8.994	9.023	9.052	9.082	9.111	9.141	9.170	9.200	9.229	380
390	9.229	9.259	9.288	9.317	9.347	9.376	9.406	9.436	9.466	9.495	9.525	390
400	9.525	9.555	9.584	9.614	9.644	9.674	9.703	9.733	9.763	9.793	9.823	400
° F	0	1	2	3	4	5	6	7	8	9	10	° F

\*Based on the International Temperature Scale of 1948.

# Table 21. Copper-Constantan Thermocouples—Con.

(Electromotive Force in Absolute Millivolts. Temperatures in Degrees F.\* Reference Junctions at 32° F.)

°F	0	1	2	3	4	5	6	7	8	9	10	°F
Millivolts												
400	9.525	9.555	9.584	9.614	9.644	9.674	9.703	9.733	9.763	9.793	9.823	400
410	9.823	9.853	9.883	9.913	9.943	9.973	10.003	10.033	10.063	10.093	10.123	410
420	10.123	10.153	10.183	10.213	10.243	10.273	10.303	10.333	10.363	10.393	10.423	420
430	10.423	10.453	10.483	10.514	10.544	10.574	10.604	10.635	10.665	10.695	10.726	430
440	10.726	10.756	10.787	10.817	10.848	10.878	10.909	10.939	10.969	11.000	11.030	440
450	11.030	11.061	11.091	11.122	11.152	11.183	11.214	11.244	11.275	11.305	11.336	450
460	11.336	11.366	11.397	11.428	11.459	11.490	11.520	11.551	11.581	11.612	11.643	460
470	11.643	11.674	11.704	11.735	11.766	11.797	11.828	11.859	11.891	11.922	11.953	470
480	11.953	11.984	12.015	12.046	12.077	12.108	12.138	12.170	12.201	12.232	12.263	480
490	12.263	12.294	12.325	12.356	12.387	12.418	12.450	12.481	12.512	12.543	12.575	490
500	12.575	12.606	12.637	12.669	12.700	12.732	12.763	12.794	12.825	12.857	12.888	500
510	12.888	12.919	12.951	12.983	13.014	13.046	13.077	13.108	13.140	13.172	13.203	510
520	13.203	13.235	13.267	13.298	13.330	13.362	13.393	13.425	13.457	13.488	13.520	520
530	13.520	13.552	13.583	13.615	13.647	13.678	13.710	13.742	13.774	13.806	13.838	530
540	13.838	13.869	13.901	13.933	13.965	13.997	14.029	14.061	14.093	14.125	14.157	540
550	14.157	14.189	14.221	14.253	14.285	14.317	14.349	14.381	14.413	14.445	14.477	550
560	14.477	14.509	14.541	14.573	14.605	14.637	14.670	14.702	14.734	14.766	14.799	560
570	14.799	14.831	14.864	14.896	14.928	14.961	14.993	15.025	15.057	15.090	15.122	570
580	15.122	15.155	15.187	15.219	15.252	15.284	15.317	15.349	15.382	15.414	15.447	580
590	15.447	15.480	15.512	15.545	15.577	15.610	15.642	15.675	15.707	15.740	15.773	590
600	15.773	15.806	15.838	15.871	15.904	15.937	15.969	16.002	16.035	16.068	16.101	600
610	16.101	16.133	16.166	16.199	16.232	16.264	16.297	16.330	16.363	16.396	16.429	610
620	16.429	16.462	16.495	16.528	16.560	16.592	16.626	16.659	16.692	16.725	16.758	620
630	16.758	16.791	16.824	16.857	16.890	16.924	16.957	16.990	17.023	17.056	17.089	630
640	17.089	17.122	17.155	17.189	17.222	17.255	17.288	17.321	17.354	17.388	17.421	640
650	17.421	17.454	17.488	17.521	17.554	17.588	17.621	17.654	17.688	17.721	17.754	650
660	17.754	17.788	17.821	17.854	17.888	17.921	17.955	17.988	18.022	18.055	18.089	660
670	18.089	18.123	18.156	18.190	18.223	18.257	18.290	18.324	18.357	18.391	18.425	670
680	18.425	18.458	18.492	18.526	18.560	18.593	18.627	18.660	18.694	18.727	18.761	680
690	18.761	18.795	18.829	18.863	18.896	18.930	18.964	18.998	19.032	19.066	19.100	690
700	19.100	19.134	19.168	19.201	19.235	19.269	19.303	19.337	19.371	19.405	19.439	700
710	19.439	19.473	19.506	19.540	19.574	19.608	19.642	19.676	19.711	19.745	19.779	710
720	19.779	19.813	19.847	19.881	19.915	19.949	19.983	20.018	20.052	20.086	20.120	720
730	20.120	20.154	20.188	20.223	20.257	20.291	20.325	20.359	20.394	20.428	20.463	730
740	20.463	20.497	20.531	20.565	20.599	20.634	20.668	20.702	20.736	20.771	20.805	740
750	20.805	20.840	20.874	-----	-----	-----	-----	-----	-----	-----	-----	750
°F	0	1	2	3	4	5	6	7	8	9	10	°F

\*Based on the International Temperature Scale of 1948.



# Table 22. Chromel-Constantan Thermocouples

(Electromotive Force in Absolute Millivolts. Temperature in Degrees F.\* Reference Junctions at 32° F.)

° F	0	10	20	30	40	50	60	70	80	90	100	° F
	Millivolts											
-300	-8.30	-8.45	-8.60	-7.04	-7.24	-7.44	-7.62	-7.80	-7.97	-8.14	-8.30	-300
-200	-6.40	-6.62	-6.83	-4.73	-4.98	-5.23	-5.48	-5.72	-5.95	-6.18	-6.40	-200
-100	-3.94	-4.21	-4.47	-1.94	-2.24	-2.54	-2.83	-3.11	-3.39	-3.67	-3.94	-100
(-)0	-1.02	-1.33	-1.64	-1.94	-2.24	-2.54	-2.83	-3.11	-3.39	-3.67	-3.94	(-)0
(+)0	-1.02	-0.71	-0.39	-0.07	0.26	0.59	0.92	1.26	1.59	1.93	2.27	(+)0
100	2.27	2.62	2.97	3.32	3.68	4.04	4.40	4.77	5.13	5.50	5.87	100
200	5.87	6.25	6.62	7.00	7.38	7.76	8.15	8.54	8.93	9.32	9.71	200
300	9.71	10.11	10.51	10.91	11.31	11.71	12.11	12.52	12.93	13.34	13.75	300
400	13.75	14.17	14.59	15.00	15.42	15.84	16.26	16.68	17.10	17.52	17.95	400
500	17.95	18.38	18.81	19.23	19.66	20.09	20.52	20.95	21.39	21.82	22.25	500
600	22.25	22.69	23.13	23.57	24.00	24.44	24.88	25.32	25.76	26.20	26.65	600
700	26.65	27.09	27.53	27.97	28.42	28.86	29.31	29.75	30.19	30.64	31.09	700
800	31.09	31.54	31.98	32.43	32.87	33.32	33.77	34.22	34.67	35.12	35.57	800
900	35.57	36.02	36.47	36.92	37.37	37.82	38.26	38.71	39.16	39.61	40.06	900
1,000	40.06	40.51	40.96	41.41	41.86	42.31	42.76	43.21	43.66	44.11	44.56	1,000
1,100	44.56	45.01	45.46	45.91	46.36	46.81	47.26	47.71	48.15	48.60	49.04	1,100
1,200	49.04	49.49	49.93	50.37	50.82	51.27	51.72	52.16	52.61	53.05	53.50	1,200
1,300	53.50	53.94	54.38	54.83	55.27	55.71	56.15	56.59	57.03	57.48	57.92	1,300
1,400	57.92	58.36	58.80	59.24	59.68	60.11	60.55	60.99	61.43	61.86	62.30	1,400
1,500	62.30	62.74	63.17	63.60	64.04	64.47	64.90	65.34	65.77	66.20	66.63	1,500
1,600	66.63	67.05	67.48	67.91	68.34	68.76	69.19	69.62	70.05	70.47	70.90	1,600
1,700	70.90	71.32	71.75	72.17	72.60	73.02	73.44	73.86	74.28	74.70	75.12	1,700
1,800	75.12	75.53	75.95	76.37								1,800
° F	0	10	20	30	40	50	60	70	80	90	100	° F

\*Based on the International Temperature Scale of 1948.

WASHINGTON, November 15, 1954.